United States
Department of
Agriculture

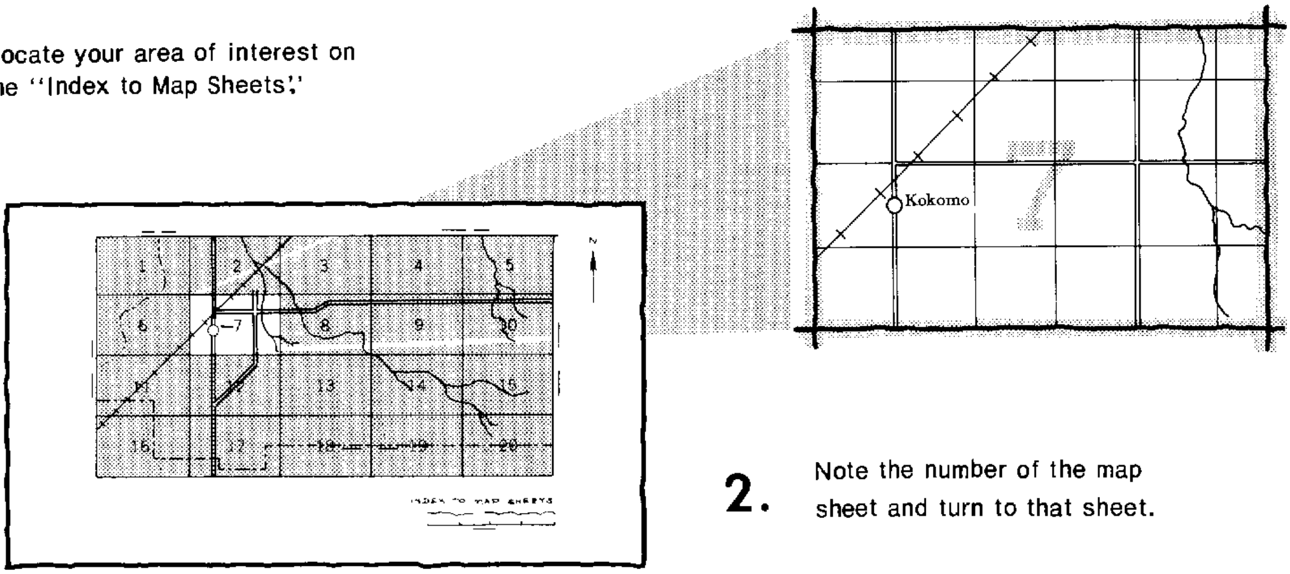
Soil
Conservation
Service

In cooperation with
Louisiana Agricultural Experiment
Station and
the Louisiana Soil and Water
Conservation Committee

Soil Survey of Concordia Parish, Louisiana

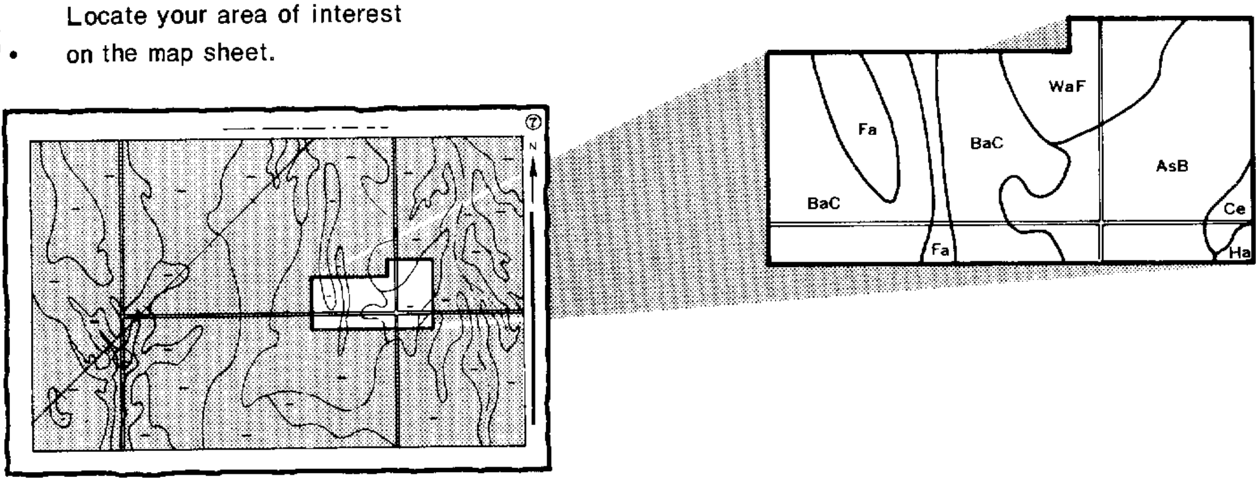
HOW TO USE

1. Locate your area of interest on the "Index to Map Sheets."

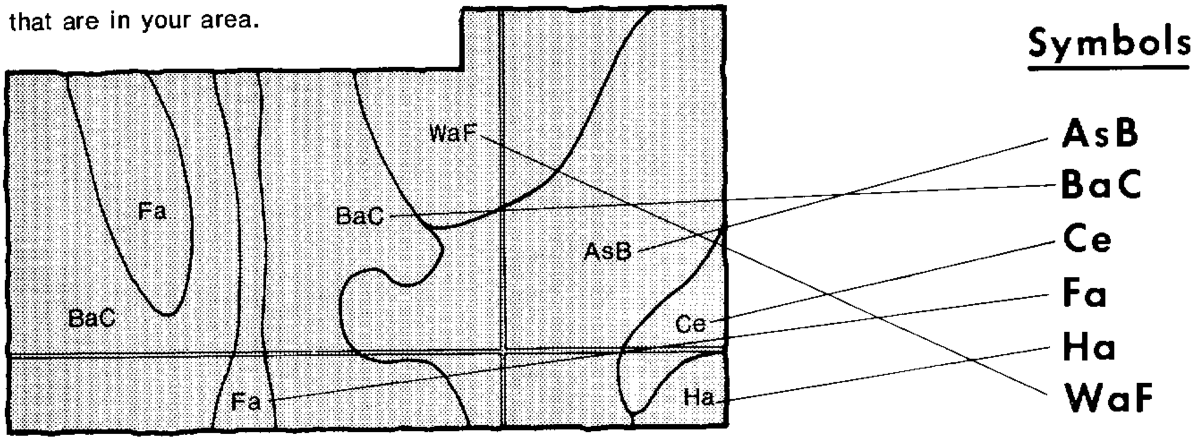


2. Note the number of the map sheet and turn to that sheet.

3. Locate your area of interest on the map sheet.

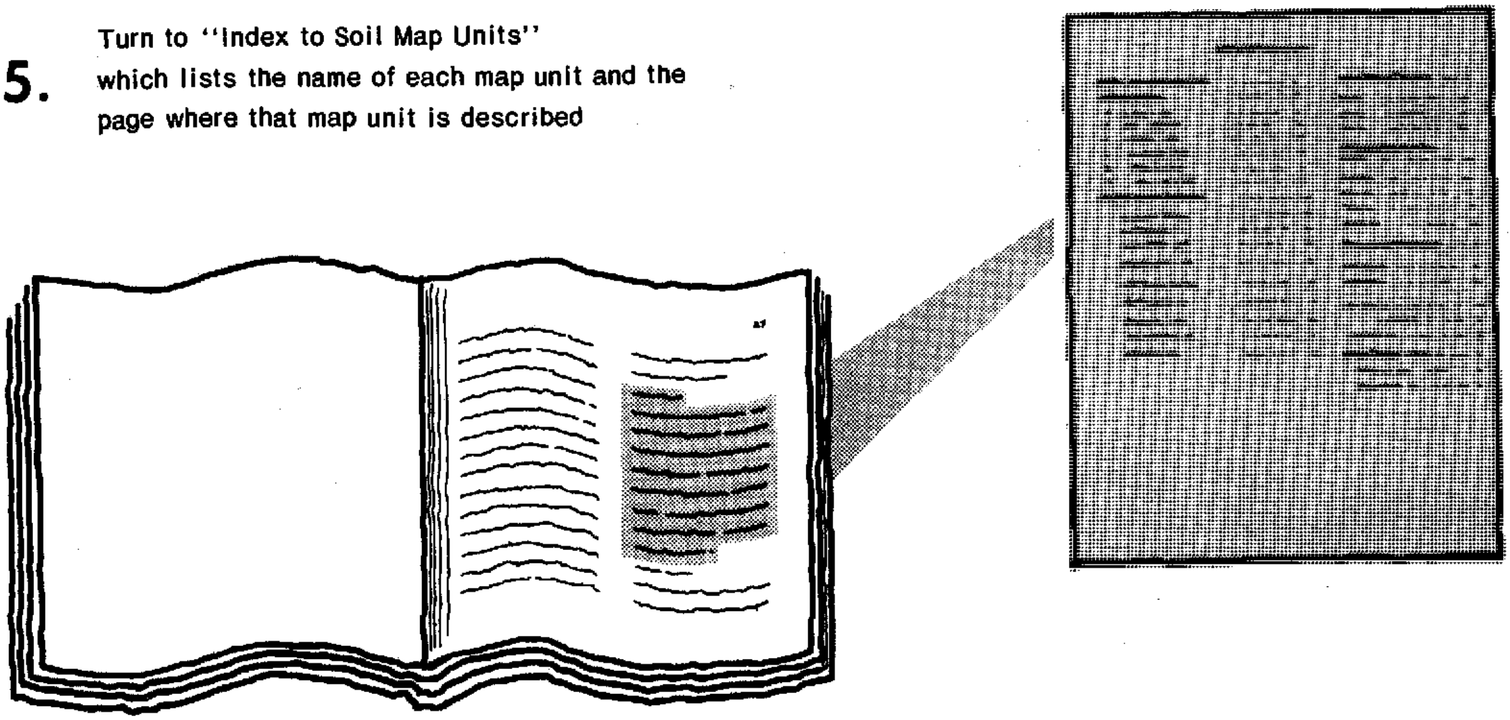


4. List the map unit symbols that are in your area.

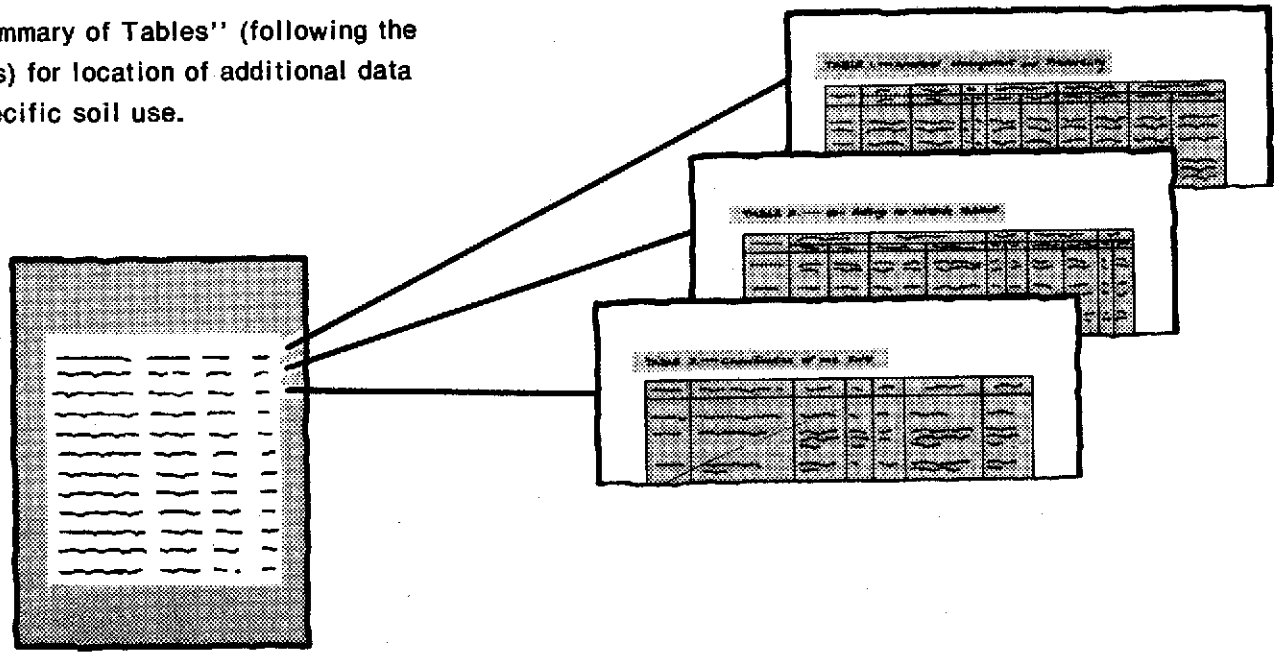


THIS SOIL SURVEY

5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described



6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; to specialists in wildlife management, waste disposal, or pollution control.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was completed in 1982. Soil names and descriptions were approved in 1982. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1982. This soil survey was made cooperatively by the Soil Conservation Service, the Louisiana Agricultural Experiment Station, and the Louisiana Soil and Water Conservation Committee. It is part of the technical assistance furnished to the Tensas-Concordia Soil and Water Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

Cover: Cotton, an important crop in Concordia Parish, is grown mainly on the higher lying loamy soils, such as Dundee loam.

Contents

Index to map units iv
Summary of tables v
Foreword vii
General nature of the survey area 1
How this survey was made 4
  Map unit composition 5
General soil map units 7
  Broad land use considerations 12
Detailed soil map units 13
Prime farmland 51
Use and management of the soils 53
  Crops and pasture 53
  Woodland management and productivity 56
  Recreation 57
  Wildlife habitat 58
  Engineering 60
Soil properties 65
  Engineering index properties 65
  Physical and chemical properties 66
  Soil and water features 67
  Soil fertility levels 68
  Physical and chemical analyses of selected soils... 71
  Interpretation of laboratory data 71
Classification of the soils 73
Soil series and their morphology 73
Formation of the soils 85
  Processes of soil formation 85
  Factors of soil formation 86
  Landforms and surface geology 89
References 91
Glossary 93
Tables 99

Soil Series

Alligator series 73
Baldwin series 74
Bruin series 75
Cocodrie series 76
Commerce series 76
Crevasse series 77
Dundee series 78
Fausse series 78
Latanier series 79
Newellton series 80
Norwood series 80
Sharkey series 81
Sostien series 82
Tensas series 82
Tunica series 83

Issued February 1988

Index to Map Units

Aa—Alligator clay 13
Ab—Alligator clay, occasionally flooded 14
Ac—Alligator clay, gently undulating, occasionally flooded 15
Ba—Baldwin silty clay loam 16
Bn—Bruin silt loam 17
Br—Bruin silt loam, gently undulating 17
Bu—Bruin silt loam, occasionally flooded 18
Bw—Bruin-Tunica complex, gently undulating 19
Ca—Commerce silt loam 20
Cb—Commerce silt loam, gently undulating 20
Cc—Commerce silt loam, occasionally flooded 21
Cm—Commerce silty clay loam 22
Co—Commerce silty clay loam, occasionally flooded 22
CR—Commerce and Bruin soils, frequently flooded .. 23
Cv—Crevasse fine sand, frequently flooded 24
Dd—Dundee loam 25
De—Dundee silty clay loam 26
Dh—Dundee-Alligator-Tensas complex, gently undulating 26
Ds—Dundee-Alligator-Tensas complex, undulating 28
Fa—Fausse clay 29
La—Latanier clay, gently undulating, occasionally flooded 29
Ne—Newellton clay 31
NS—Newellton and Sharkey soils, frequently flooded 32
Nw—Norwood silt loam, gently undulating, occasionally flooded 33
Sa—Sharkey silt loam 34
Sh—Sharkey clay 34
Sk—Sharkey clay, occasionally flooded 35
Sm—Sharkey clay, gently undulating, occasionally flooded 37
So—Sharkey clay, frequently flooded 38
Sr—Sharkey clay, overwash, occasionally flooded 38
SS—Sostien-Cocodrie association, occasionally flooded 39
ST—Sostien-Crevasse association, 0 to 5 percent slopes 40
Tc—Tensas silty clay 41
Te—Tensas silty clay, occasionally flooded 42
To—Tensas-Alligator complex, undulating 43
Tr—Tensas-Alligator complex, undulating, occasionally flooded 44
Ts—Tunica clay 45
Tt—Tunica clay, occasionally flooded 47
Tu—Tunica-Sharkey complex, gently undulating 47
Ty—Tunica-Sharkey complex, gently undulating, occasionally flooded 48

Summary of Tables

Temperature and precipitation (table 1) 100

Freeze dates in spring and fall (table 2) 101

Probability Temperature

Growing season (table 3) 101

Suitability and limitations of general soil map units (table 4) 102

Percent of area Cultivated crops Pasture Woodland Urban uses

Acreage and proportionate extent of the soils (table 5) 103

Acres Percent

Land capability classes and yields per acre of crops and pasture (table 6) 104

Soybeans Cottonlint Wheat Rice Improved bermudagrass Tall fescue

Capability classes and subclasses (table 7) 106

Total acreage Major management concerns

Woodland management and productivity (table 8) 107

Ordination symbol Management concerns Potential productivity Trees to plant

Recreational development (table 9) 112

Camp areas Picnic areas Playgrounds Paths and trails Golf fairways

Wildlife habitat (table 10) 116

Potential for habitat elements Potential as habitat for—Openland wildlife, Woodland wildlife Wetland wildlife

Building site development (table 11) 119

Shallow excavations Dwellings without basements Small commercial buildings Local roads and streets Lawns and landscaping

Sanitary facilities (table 12) 123

Septic tank absorption fields Sewage lagoon areas Trench sanitary landfill Area sanitary landfill Daily cover for landfill

Construction materials (table 13) 127

Roadfill Topsoil

Water management (table 14) 130

Limitations for—Pond reservoir areas, Embankments dikes, and levees Features affecting—Drainage, Irrigation Grassed waterways

Engineering index properties (table 15) 134
Depth USDA texture Classification—Unified, AASHTO Fragments greater than 3 inches Percentage passing sieve—4 10, 40 200 Liquid limit Plasticity index

Physical and chemical properties of the soils (table 16) 141
Depth Clay Moist bulk density Permeability Available water capacity Soil reaction Shrink-swell potential Erosion factors Organic matter

Soil and water features (table 17) 145
Hydrologic group Flooding High water table Risk of corrosion

Fertility test data on selected soils (table 18) 148
Depth from surface Horizon pH Organic matter content Extractable P Exchangeable cations Extractable acidity Cation exchange capacity Base saturation Saturation

Physical test data for selected soils (table 19) 150
Horizon Depth from surface Particle-size distribution Water content at tension Water retention difference Bulk density Extensibility

Chemical test data for selected soils (table 20) 151
Horizon Depth from surface Exchangeable cations Extractable acidity Cation exchange capacity Base saturation Organic matter content Nitrogen pH Extractable iron Extractable aluminum Extractable phosphorus

Mineralogy data of silt and clay fractions of selected soils (table 21) 152
Depth from surface Horizon Silt and very fine fractions Clay fraction

Classification of the soils (table 22) 153
Family or higher taxonomic class

Relationships between soils and topography, runoff, drainage, and water table (table 23) 154
Slope Runoff Natural drainage Seasonal high water table

Foreword

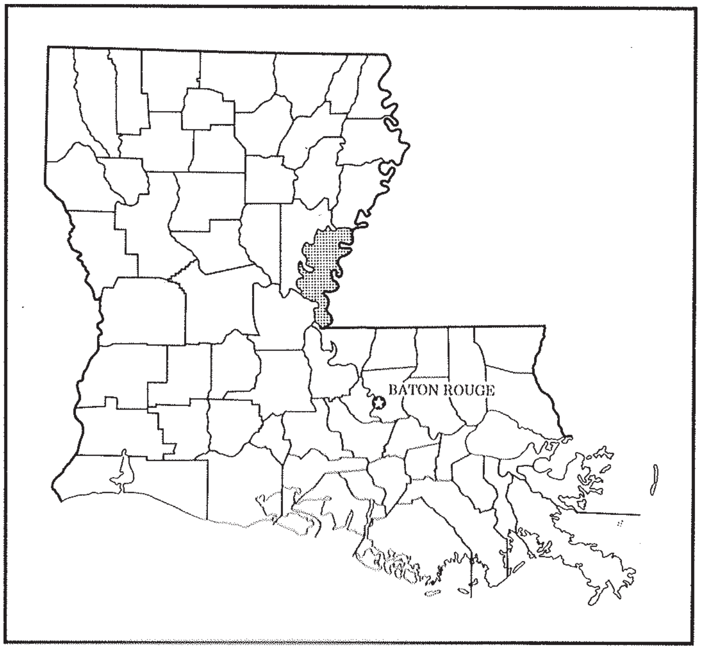
This soil survey contains information that can be used in land-planning programs in Concordia Parish It contains predictions of soil behavior for selected land uses The survey also highlights limitations and hazards inherent in the soil improvements needed to overcome the limitations and the impact of selected land uses on the environment

This soil survey is designed for many different users Farmers foresters and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production Planners community officials engineers developers, builders, and home buyers can use the survey to plan land use select sites for construction, and identify special practices needed to insure proper performance Conservationists teachers students, and specialists in recreation wildlife management waste disposal and pollution control can use the survey to help them understand protect and enhance the environment

Great differences in soil properties can occur within short distances Some soils are seasonally wet or subject to flooding Some are too unstable to be used as a foundation for buildings or roads Clayey or wet soils are poorly suited to use as septic tank absorption fields A high water table makes a soil poorly suited to basements or underground installations

These and many other soil properties that affect land use are described in this soil survey Broad areas of soils are shown on the general soil map The location of each soil is shown on the detailed soil maps Each soil in the survey area is described Information on specific uses is given for each soil Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service

Harry Rucker
State Conservationist
Soil Conservation Service



Location of Concordia Parish in Louisiana.

Soil Survey of Concordia Parish, Louisiana

By: Paul G. Martin, Soil Conservation Service

Soils surveyed by Paul G. Martin, William H. Boyd and
Burnell Muse, Soil Conservation Service,
and Marc J. Bordelon, Louisiana Soil and Water Conservation Committee

United States Department of Agriculture, Soil Conservation Service
In cooperation with the Louisiana Agricultural Experiment Station
and Louisiana Soil and Water Conservation Committee

CONCORDIA PARISH is in the east-central part of Louisiana. Vidalia, the parish seat, overlooks the Mississippi River and is about 75 miles east of Alexandria.

The parish is chiefly rural and had a population of 22,593 in 1980. It has a total area of 479,113 acres, of which 22,230 acres is rivers, lakes and bayous greater than 40 acres in size.

Concordia Parish is almost entirely bounded by rivers, except for short stretches of land on the north and south boundaries. Major rivers forming the boundaries of the parish are the Mississippi River on the east, the Tensas River on the north, and the Black and Red Rivers on the west and south. About 80 percent of the parish is protected from headwater flooding by a manmade ring levee; however, some large areas within this levee system are still subject to flooding because of inadequate outlets.

Land use is mainly agriculture and woodland. About 63 percent of the land is cultivated cropland or in pastureland and about 32 percent is in woodland. The current trend indicates an increasing acreage in cropland and a decreasing acreage in woodland and pastureland.

Concordia Parish is on the alluvial plain of the Mississippi River. Elevation ranges from about 30 feet above sea level in the southern part of the parish to about 65 feet in the northern part, a distance of about 50 miles. The alluvial plain consists of level to undulating soils on natural levees along current and former channels of the Mississippi River and low, level soils between natural levees.

The soils on the natural levees mostly are loamy, high to medium in fertility, and are used mainly for cultivated crops, pasture, and urban uses. The principal crops grown on these loamy soils are soybeans, cotton, and wheat. The soils in the low areas between natural levees and on the lower parts of natural levees are clayey, high to medium in fertility, and are used for cultivated crops, pastureland, and woodland. Soybeans, rice, and grain sorghum are the principal crops grown on these clayey soils.

Descriptions, names, and delineations of soils in this soil survey do not fully agree with those on soil maps of adjacent parishes or the adjacent state of Mississippi. Differences are the result of better knowledge of soils, modifications in series concepts, intensity of mapping, or the extent of soils within the survey area.

General Nature of the Survey Area

This section gives general information about the parish. It discusses climate, history and development, agriculture, transportation, flood control, and water resources.

Climate

Prepared by the National Climatic Data Center, Asheville, North Carolina.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Old River Lock in the period 1965 to 1979. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 49 degrees F, and the average daily minimum temperature is 38 degrees. The lowest temperature on record, which occurred at Old River Lock on January 11, 1977, is 13 degrees. In summer the average temperature is 80 degrees, and the average daily maximum temperature is 91 degrees. The highest recorded temperature, which occurred at Old River Lock on July 25, 1977, is 101 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 60 inches. Of this, 30 inches, or 50 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 23 inches. The heaviest 1-day rainfall during the period of record was 12.44 inches at Old River Lock on April 15, 1967. Thunderstorms occur on about 65 days each year, and most occur in summer.

Snowfall is rare. In 80 percent of the winters, there is no measurable snowfall. In 20 percent, the snowfall, usually of short duration, is more than 2 inches. The heaviest 1-day snowfall on record was more than 2 inches.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 90 percent. The sun shines 65 percent of the time possible in summer and 50 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 9 miles per hour, in spring.

Severe local storms, including tornadoes, strike occasionally in or near the area. They are of short duration and cause variable and spotty damage. Every few years in summer or autumn, a tropical depression or remnant of a hurricane that has moved inland causes extremely heavy rains for 1 to 3 days.

History and Development

Concordia Parish was created by the Legislative Council of Orleans Territory as a "county" in 1804. It was redesignated as a parish in 1807 and boundaries were changed. Concordia Parish's present boundaries were established in 1843 *(9)*.

Concordia Parish had a population of 22,593 in 1980. Most people live in or around the 4 incorporated towns in the northeast part of the parish. The main communities are Vidalia, Ferriday, Clayton, Ridgecrest, and Monterey. The seat of government is Vidalia. Its population in 1980 was 5,040.

Concordia Parish derives its name from its first permanent settlement, the "Post of Concord." This settlement, renamed Vidalia in 1811, was established in 1798 when the area was still under Spanish control. The settlement began when Don Jose Vidal obtained land grants on the Mississippi River opposite Natchez for himself and his sons. By 1803, most of the Mississippi River frontage and the land around Lakes Concordia and St. John had been laid out in grants and settled. Recurring floods restricted settlement to the higher natural levees along the major streams and abandoned stream channels. Settlement began in the northern and western parts of the parish in the 1830's. Not until 1852 did settlement expand south along the Black River.

Concordia Parish has an abundance of natural resources which include oil, natural gas, woodland, wildlife and fishery resources, and fertile soils. The mild climate and plentiful rainfall produce ideal conditions for timber and agricultural crops.

Agriculture is the most important industry in the parish. Industrial development has been slow; however, several non-agricultural industries are in production. About 25 oil and gas fields are throughout the parish and exploration for new wells continues *(33)*. Numerous businesses service the oil and gas fields and contribute substantially to the economy of the area. The timber industry, once important to the economy, has declined in recent years.

Agriculture

Farming has always been important in Concordia Parish. The first permanent settlers were lured to the area by large grants of land. Indigo and cotton were the main cash crops grown on the early farms or plantations. Cotton soon became dominant and was the main crop for many years. Cotton has since declined, to about 10,680 acres in 1982.

Soybeans is now the principal crop in Concordia Parish. Soybean acreage has increased tremendously in recent years. In 1969, about 76,000 acres of soybeans were grown in the parish and in 1982, approximately 230,000 acres were grown. About 3,780,000 bushels of soybeans, valued at $24.5 million were produced in 1981. The four major crops grown in 1981, in order of cash value, were soybeans, cotton, rice, and wheat. Other commercial crops are corn, grain sorghum, oats, and pecans.

In 1981, the value of farm products was estimated at 38,786,160 dollars, of which 99 percent was from crops, mostly soybeans. Forest products and livestock accounted for less than 1 percent of the total value *(16)*.

The trend in agriculture in Concordia Parish appears to be toward fewer, but larger, farms. Cropland has been increasing yearly as pasture and forestland has decreased. This trend in changing land use is expected to continue until all areas of hardwood forest not dedicated to wildlife habitat are cleared and cultivated.

Transportation

Concordia Parish is served by one railroad, the Missouri Pacific Railway, which carries freight to the north and east. There are two United States highways and numerous other paved state highways and parish roads. The Concordia Parish Airport, located near Vidalia, serves small private aircraft. Commercial air service is not available.

The Black and Mississippi Rivers, which are navigable for barge traffic, provide water transportation. Shipping facilities are poorly developed. Limited docking facilities are available in Vidalia; however, a suitable port is across the river, at Natchez, Mississippi.

Flood Control

Concordia Parish, located entirely on the flood plain of the Mississippi River and almost completely bounded by rivers, has been flooded many times. Efforts to protect the land began in the early part of the nineteenth century and continue today. In spite of these efforts, about 232,000 acres of land within the parish are still subject to flooding.

The Tensas-Concordia ring levee surrounds approximately 80 percent of the land in the parish (fig. 1). The ring levee consists of about 68 miles of main line levee along the Mississippi River and about 93 miles of backwater levee. The backwater levees extend from the main line levee at Shaw, across the parish to the Red River and then follow the Red, Black, and Tensas Rivers and the north boundary of the parish to Lake St. John. The ring levee protects the land from most overflows from rivers surrounding the parish, but it solves only part of the flooding problem. Most surface water within the ring levee drains through Bayou Cocodrie into the Red River. At that point, gravity drainage is periodically blocked by high water in the Red River. When drainage is blocked for extended periods, almost 150,000 acres within the ring levee is subject to flooding.

A pumping station, now under construction near the mouth of Wild Cow Bayou, will lessen this problem somewhat, but it will not eliminate it entirely. A sump area covering several thousand acres around the mouth of Bayou Cocodrie will be needed to insure efficient operation of the pumping station.

From the town of Shaw, the main line levee continues southward along the Mississippi River. The land to the west of this levee serves as a temporary storage area for backwater on the Red River and is thus subject to periodic flooding. About 38,000 acres in the southern part of the parish, along the Red River and along the Black and Tensas Rivers, are subject to backwater flooding.

Most of the parish is protected from Mississippi River overflow by the main line levee. About 44,000 acres of land, lying between the levee and the Mississippi River, are subject to frequent flooding by swiftly flowing water.

The soil maps in the back of this survey can be used to locate areas that are subject to flooding. These areas are delineated on the maps and the frequency, duration, and season of flooding are described in the section "Detailed Soil Map Units." Soils that generally flood more often than twice during each 5-year period between June 1 and November 30 are described as "frequently flooded." Soils that generally flood less often than twice during each 5-year period between June 1 and November 30 are "occasionally flooded." Soils that are not subject to flooding or are protected from flooding by levees or pumpoff systems are classified as "nonflooded."

These definitions differ from the National Soil Conservation Service definition of flooding found elsewhere, in that the frequency of flooding for each of the phases are slightly different. In addition, the definition is based on flooding from June 1 to November 30, whereas the national definition is based on flooding occurring any time during the year.

This soil survey does not replace onsite investigation. Actual flooding frequencies and elevations are best determined by on-site engineering surveys and flood stage records.

Water Resources

Surface water.—Concordia Parish has about 22,230 acres of surface water in areas 40 acres or more in size. An additional 5,100 acres is in bodies of water having surface areas of less than 40 acres. The largest sources of surface water are the Mississippi, Red, Black, and Tensas Rivers, which form the boundaries of the parish. Other important streams are Cocodrie Bayou, Black Bayou, Wild Cow Bayou, Bayou Cross Cocodrie, Vidalia Canal, Greens Bayou, and Long Bayou. More than 20 lakes have a surface area of 40 acres or more. The largest is Lake St. John, that has a surface area of more than 2,000 acres. Other large lakes are Lake Concordia, Black Bayou Lake, Cocodrie or Horseshoe Lake, Lower Sunk Lake, Grand Bay, and Black Lake.

Ground water.—The Quaternary aquifer system is the most important ground water reservoir in the parish. It underlies the entire parish and is composed mainly of poorly sorted sand and gravel. The Quaternary system is about 50 to 150 feet thick and is capable of yielding large quantities of hard water. The water is generally suitable for irrigation; however, treatment for its hardness and high iron content is necessary for most other uses. Wells completed in the Quaternary aquifer generally are 150 to 700 feet deep *(25)*.

The less permeable upper Tertiary aquifer system that yields small to large quantities of soft water underlies the

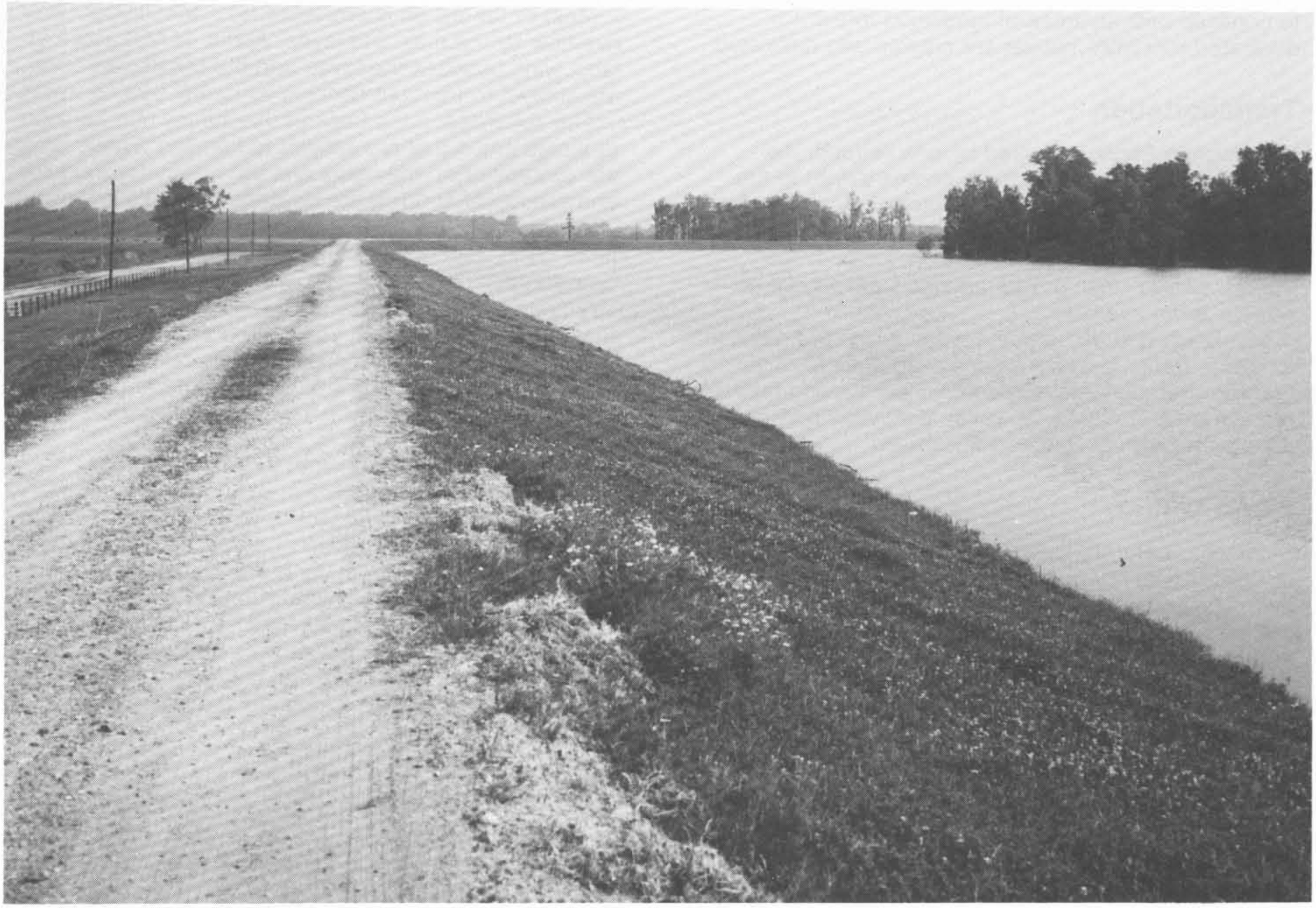


Figure 1.—This large earthen levee is part of the Tensas-Concordia ring levee system that protects much of Concordia Parish from flooding.

Quaternary system. Wells completed in the upper Tertiary system have yielded soft water at rates ranging from 300 to 1,500 gallons per minute. Salt water is present in the upper Tertiary system in the southwest corner of the parish.

Water levels in both aquifer systems are generally less than 50 feet below land surface. Available data indicate that there is no parish-wide water level decline in either aquifer system.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; and the kinds of crops and native plants growing on the soils. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material from which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, the landforms, relief, climate, and the natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with considerable accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, acidity, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area are generally collected for laboratory analyses and for engineering tests. Soil scientists interpreted the data from these analyses and tests as well as the field-observed characteristics and the soil properties in terms of expected behavior of the soils under different uses. Interpretations for all of the soils were field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and new interpretations sometimes are developed to meet local needs. Data were assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management were assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can state with a fairly high degree of probability that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by several kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. In the detailed soil map units, these latter soils are called inclusions or included soils. In the general soil map units, they are called soils of minor extent.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed, and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soils on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, a map unit consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in other units but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or a building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

The soils in the survey area vary widely in their suitability for major land uses. Table 4 shows the extent of the map units shown on the general soil map. It lists the suitability of each, in relation to that of the other map units, for major land uses and shows soil properties that limit use. Soil suitability ratings are based on the practices commonly used in the survey area to overcome soil limitations. These ratings reflect the ease of overcoming the limitations. They also reflect the problems that will persist even if such practices are used.

Each map unit is rated for *cultivated crops, pasture, woodland, and urban uses.* Cultivated crops are those grown extensively in the survey area. Pasture refers to pastures of native and improved grasses. Woodland refers to areas of native or introduced trees. Urban uses include residential, commercial, and industrial developments.

The boundaries of the general soil map units in Concordia Parish were matched, when possible, with those of previously published surveys of Tensas Parish, Louisiana, and Adams County, Mississippi. In a few places, however, the lines do not join and the names of the map units differ. These differences resulted mainly because of changes in soil series concepts, differences in map unit design, and changes in soil patterns near survey area boundaries.

Soils That are Loamy; on Flood Plains

This group of map units consists of somewhat poorly drained, poorly drained, and moderately well drained soils that are loamy throughout or have a loamy surface layer and a loamy or a clayey and loamy subsoil. These soils are protected from flooding by the Tensas-Concordia ring levee.

The two map units in this group make up about 11.3 percent of the parish. Most of the acreage is in crops or pasture. Woodland areas generally are small and scattered. Seasonal wetness is the main limitation for most uses.

1. Commerce-Bruin

Level to gently undulating, somewhat poorly drained and moderately well drained soils that are loamy throughout; formed in young Mississippi River alluvium

This map unit consists of soils in high and intermediate positions on natural levees along the Mississippi River and Lakes Concordia and St. John. The landscape consists mainly of long, smooth areas where the slope is 0 to 1 percent. In some places, low, parallel ridges and swales have slopes of 0 to 3 percent. Most areas of this map unit are protected from flooding by the Tensas-Concordia ring levee, but some areas in the southern part of the parish are subject to occasional flooding.

This map unit makes up about 7 percent of the parish. It is about 65 percent Commerce soils, 30 percent Bruin soils, and 5 percent soils of minor extent.

The Commerce soils are in high and intermediate positions on natural levees. These soils are somewhat poorly drained. The surface layer is dark grayish brown, neutral silt loam or silty clay loam. The subsoil is grayish brown, mildly alkaline and moderately alkaline silt loam. The underlying material is grayish brown and dark grayish brown, mildly alkaline and moderately alkaline silt loam and silty clay loam.

The Bruin soils are in the highest positions on natural levees. These moderately well drained soils have a surface layer of dark grayish brown, slightly acid silt loam. The subsoil is dark brown and brown, neutral and mildly alkaline silt loam and very fine sandy loam. The underlying material is grayish brown and dark brown, neutral very fine sandy loam.

Of minor extent are the somewhat poorly drained Newellton soils and the poorly drained Sharkey and

Tunica soils, all of which are in low positions on natural levees and in swales.

The soils in this map unit are used mainly for crops and urban development. Soybeans and cotton are the main crops. Small acreages are in pasture, pecan orchards, or woodland.

The soils in most areas of this map unit are well suited to crops and pasture. In a few areas, where they are subject to occasional flooding, these soils are moderately well suited to crops and pasture. The loamy surface layer, high fertility, and gentle slopes favor these uses. Wetness is the main limitation. Land grading or smoothing and a surface drainage system are needed in some places.

These soils are well suited to use as woodland. The predominant trees are sugarberry, eastern cottonwood, sweetgum, and water oak. Productivity of eastern cottonwood is very high. In most years, in winter and early in spring, logging operations may be somewhat restricted by wetness.

The soils in this map unit are moderately well suited to use as sites for buildings and poorly suited to use as sites for sanitary facilities. Wetness and moderate shrink-swell potential are the main limitations. In a few areas, these soils are subject to occasional flooding and are not suited to use as building sites. They are poorly suited to most other urban uses.

2. Dundee-Baldwin

Level, somewhat poorly drained and poorly drained soils that have a loamy surface layer and a loamy or a clayey and loamy subsoil; formed in old Mississippi River alluvium

This map unit consists of soils in high and intermediate positions on natural levees along old channels of the Mississippi River. The landscape consists of long, smooth areas where the slope is 0 to 1 percent. All areas of this map unit are protected from flooding by the Tensas-Concordia ring levee.

This unit makes up about 4.3 percent of the parish. It is about 51 percent Dundee soils, 45 percent Baldwin soils, and 4 percent soils of minor extent.

The Dundee soils are in the highest positions on the natural levees. These soils are somewhat poorly drained. The surface layer is brown, slightly acid loam or silty clay loam. The subsoil is grayish brown, very strongly acid clay loam and loam. The underlying material is grayish brown, very strongly acid and strongly acid loam.

The Baldwin soils are in intermediate positions on the natural levees. These soils are poorly drained. The surface layer is very dark grayish brown, medium acid silty clay loam. The subsoil is dark gray and olive gray, medium acid to neutral silty clay and silty clay loam. The underlying material is olive gray, mildly alkaline silty clay and silty clay loam.

Of minor extent are Alligator, Sharkey, and Tensas soils. Alligator and Sharkey soils are clayey and poorly drained and in low positions on the natural levees. The somewhat poorly drained Tensas soils are in intermediate positions on the natural levees.

Most acreage has been cleared and is used mainly for crops and urban development. Soybeans and cotton are the main crops. Small acreages are in pasture or woodland.

The soils in this map unit are well suited to crops and pasture. The loamy surface layer, moderately high fertility, and level slopes favor these uses. Wetness is the main limitation. A surface drainage system is needed in most places. Lime and fertilizer are needed for crops and pasture plants.

These soils are well suited to use as woodland. The predominant trees are sweetgum, willow oak, water oak, and Nuttall oak. Logging operations are restricted by wetness in most years, in winter and early in spring.

The soils in this map unit are moderately well suited to most urban uses. The main limitations are wetness, moderately slow or very slow permeability, and moderate to very high shrink-swell potential.

Soils That are Clayey or Loamy; on Flood Plains

This group of map units consists of poorly drained and somewhat poorly drained soils that have a clayey or loamy surface layer and a clayey or loamy or a clayey and loamy subsoil. Most areas of these soils are protected from flooding by the Tensas-Concordia ring levee.

The two map units in this group make up about 39 percent of the parish. Most of the acreage is in crops or pasture. A few large areas are in woodland. Seasonal wetness, slow or very slow permeability, and very high shrink-swell potential are the main limitations for most uses.

3. Alligator-Tensas-Dundee

Level to undulating, poorly drained and somewhat poorly drained soils that have a clayey or loamy surface layer and a clayey or loamy or a clayey and loamy subsoil; formed in old Mississippi River alluvium

This map unit consists of soils on the alluvial plain. These soils are on narrow ridges, in shallow swales, and in broad, level areas. Relief is about 3 to 5 feet and the slope ranges from 0 to 5 percent. Most areas of this map unit are protected from flooding by the Tensas-Concordia ring levee, but some areas in the western part of the parish are subject to occasional flooding.

This map unit makes up about 29 percent of the parish. It is about 42 percent Alligator soils, 36 percent Tensas soils, 10 percent Dundee soils, and 12 percent soils of minor extent.

The poorly drained Alligator soils are level and gently undulating. They are in swales and in low positions on flood plains. The surface layer is dark grayish brown, medium acid clay or silty clay loam. The subsoil is gray and dark gray, very strongly acid and strongly acid clay. The underlying material is gray, slightly acid clay.

The somewhat poorly drained Tensas soils are level to undulating. They are on low ridges and in intermediate positions on natural levees along distributary channels. The surface layer is dark grayish brown, strongly acid silty clay. The upper part of the subsoil is grayish brown and dark grayish brown, very strongly acid silty clay and clay; and the lower part is grayish brown, strongly acid clay loam. The underlying material is grayish brown, medium acid clay loam.

The somewhat poorly drained Dundee soils are level to undulating. They are in high positions on ridges and natural levees along distributary channels. The surface layer is brown, slightly acid loam or silty clay loam. The subsoil is grayish brown, very strongly acid clay loam and loam. The underlying material is grayish brown, very strongly acid and strongly acid loam.

Of minor extent are Baldwin, Fausse, and Sharkey soils. The poorly drained Baldwin soils are in intermediate positions on natural levees. The poorly drained Fausse soils are in deep swales and broad depressions. The poorly drained Sharkey soils are in shallow swales and other low positions on flood plains.

Most soils in this map unit are used for crops, mainly soybeans, or for woodland. The wooded areas have good stands of hardwood timber and provide excellent wildlife habitat. Small acreages are in pasture or pecan orchards.

The soils in this map unit are moderately well suited to crops and pasture. Wetness, poor tilth, and undulating topography are the main limitations. Land smoothing and a surface drainage system are needed in most places. Lime and fertilizer are needed for most crops and pasture plants.

These soils are well suited to use as woodland. The predominant trees are sweetgum, willow oak, water oak, Nuttall oak, and overcup oak. Wetness and the clayey surface layer generally restrict logging operations to summer and fall.

Alligator, Tensas, and Dundee soils are poorly suited to use as sites for buildings and sanitary facilities. The main limitations are wetness, very slow permeability, and very high shrink-swell potential. Rare flooding is a hazard. In a few areas, these soils are subject to occasional flooding and they are not suited to use as building sites.

4. Sharkey-Tunica

Level to gently undulating, poorly drained soils that have a clayey or loamy surface layer and a clayey subsoil; formed in young Mississippi River alluvium

This map unit consists of soils in broad, level areas and in gently undulating areas on the alluvial plain. The landscape consists mainly of long, smooth areas where the slope is 0 to 1 percent. In some places, low, parallel ridges and swales have slope of 0 to 3 percent. All areas of this map unit are protected from most floods by the Tensas-Concordia ring levee; however, low-lying areas are subject to rare flooding during unusually intense, prolonged rain storms.

This map unit makes up about 10 percent of the parish. It is about 74 percent Sharkey soils, 24 percent Tunica soils, and 2 percent soils of minor extent.

The Sharkey soils are in low positions on flood plains and in swales. The surface layer is generally dark grayish brown medium acid clay. In a few places, the surface layer is mildly alkaline silt loam. The subsoil is dark gray, slightly acid to mildly alkaline clay. The underlying material is gray and olive gray, neutral or mildly alkaline clay.

The Tunica soils are on low ridges and in intermediate positions on natural levees. The surface layer is dark grayish brown, slightly acid clay. The subsoil is dark gray, slightly acid clay. The underlying material is dark gray, grayish brown, and olive gray, neutral to moderately alkaline silty clay loam, very fine sandy loam, and silt loam.

Of minor extent are Alligator, Bruin, and Commerce soils. The poorly drained Alligator soils are in low positions on flood plains. The moderately well drained Bruin soils are in high positions on natural levees. The somewhat poorly drained Commerce soils are in intermediate positions on natural levees.

Most acreage has been cleared and is used for crops, mainly soybeans. A small acreage is in woodland or in pasture.

This map unit is moderately well suited to crops and pasture. Wetness and poor tilth are the main limitations. A surface drainage system is needed for crops and pasture. Lime and fertilizers are generally not needed.

These soils are well suited to use as woodland. The predominant trees are sugarberry, green ash, Nuttall oak, overcup oak, sweetgum, and water oak. Wetness and the clayey surface layer generally restrict logging operations to summer and fall.

Soils in this map unit are poorly suited to use as sites for buildings and sanitary facilities. The main limitations are wetness, very slow permeability, a very high shrink-swell potential, and the hazard of flooding.

Soils That are Clayey and Loamy and are Subject to Flooding; on Flood Plains

This group of map units consists of well drained to very poorly drained soils that have a clayey or loamy surface layer and a clayey or loamy or a clayey and loamy subsoil. These soils are subject to occasional or frequent flooding.

The four map units in this group make up about 49.7 percent of the parish. Most of the acreage is in cultivated crops or woodland. Large areas of woodland are in state- or federally-owned wildlife management areas. Wetness, very slow permeability, and the hazard of flooding are the main limitations for most uses.

5. Commerce-Bruin-Newellton

Level to undulating, somewhat poorly drained and moderately well drained soils that have a loamy or clayey surface layer and a loamy or a clayey and loamy subsoil; formed in young Mississippi River alluvium

This map unit consists of soils on narrow ridges and in shallow swales between the Mississippi River channel and the manmade levees. The soils are subject to frequent flooding, scouring, and deposition. Slope ranges from 0 to 5 percent.

This map unit makes up about 10 percent of the parish. It is about 29 percent Commerce soils, 21 percent Bruin soils, 18 percent Newellton soils, and 32 percent soils of minor extent.

The Commerce soils are in high and intermediate positions on natural levees. These soils are somewhat poorly drained. The surface layer is dark grayish brown, neutral silt loam or silty clay loam. The subsoil is grayish brown, mildly alkaline and moderately alkaline silt loam. The underlying material is grayish brown and dark grayish brown, moderately alkaline and mildly alkaline silt loam.

The Bruin soils are in high positions on natural levees. These soils are moderately well drained. The surface layer is dark grayish brown, medium acid silt loam. The subsoil is dark brown and brown, slightly acid and neutral silt loam and very fine sandy loam. The underlying material is grayish brown and dark brown, mildly alkaline very fine sandy loam.

The Newellton soils are in intermediate positions on natural levees and on low ridges. These soils are somewhat poorly drained. The surface layer is dark gray, slightly acid clay. The subsoil is dark grayish brown, neutral clay. The underlying material is dark grayish brown, grayish brown, and brown, neutral to moderately alkaline silty clay loam, silt loam, and very fine sandy loam.

Of minor extent are Crevasse, Fausse, Sharkey, and Tunica soils. The excessively drained Crevasse soils are on sand bars and in high positions along drainageways. The very poorly drained Fausse soils are in deep swales. The poorly drained Sharkey soils are in low positions and in swales, and the poorly drained Tunica soils are on low ridges and in swales.

Most areas of this map unit are in woodland and the soils are used mainly for wildlife habitat and timber production. Small acreages are in crops or pasture. Many small areas of this map unit are used as a source of borrow material for the construction of levees and other earthen structures.

These soils are moderately well suited to use as commercial woodland. The predominant trees are sugarberry, eastern cottonwood, American sycamore, sweet pecan, black willow, green ash, and Nuttall oak. Some areas of this map unit have been cleared of low quality trees and planted to eastern cottonwood and American sycamore. Wetness and flooding in winter and in spring generally restrict logging and planting operations to summer and fall.

The soils in this map unit are poorly suited to crops and pasture. Wetness and the hazard of flooding are the main limitations. Wetness and the frequency and duration of flooding severely limit the choice of crops and pasture plants. Deposition of soil material and scouring during floods can damage drainage systems.

This map unit is not suited to use as sites for building and sanitary facilities. Flooding is too severe for these uses.

6. Sharkey-Fausse

Level, poorly drained and very poorly drained soils that are clayey throughout; formed in young Mississippi River alluvium

This map unit consists of soils in low positions on natural levees and in depressions on the Red River and Mississippi River alluvial plains. The soils are subject to frequent flooding. Flooding typically occurs late in winter and in spring, but it can occur during any season. Relief is slight, and slope is less than 1 percent.

This map unit makes up about 10 percent of the parish. It is about 80 percent Sharkey soils, 9 percent Fausse soils, and 12 percent soils of minor extent.

The Sharkey soils are poorly drained. The surface layer is dark grayish brown, medium acid clay. The subsoil is dark gray, slightly acid, neutral and mildly alkaline clay. The underlying material is gray and olive gray, neutral and mildly alkaline clay. In the Red River and Three Rivers Game Management areas, a large area of Sharkey soils has a surface layer of reddish brown clay.

The Fausse soils are very poorly drained. The surface layer is very dark grayish brown, medium acid mucky clay and dark gray, neutral clay. The subsoil is gray, slightly acid clay; and the underlying material is gray, neutral clay.

Of minor extent are Alligator, Commerce, Norwood, and Tunica soils. The poorly drained Alligator soils are in low positions on natural levees. The somewhat poorly drained Commerce soils are in high and intermediate positions on natural levees. The well drained Norwood soils are along the Red River. The poorly drained Tunica soils are in intermediate positions on natural levees.

Most acreage is in woods and it is used for wildlife habitat and timber production. Small acreages are in crops or pasture.

This map unit is moderately well suited to use as commercial woodland. Wetness and the hazard of flooding in winter and in spring generally restrict logging and planting operations to summer and fall. The predominant trees are overcup oak, water hickory, green ash, sugarberry, water locust, and baldcypress.

This map unit is poorly suited to crops and pasture. Wetness and poor tilth are the main limitations. Flooding is a hazard. Wetness and the frequency and duration of flooding severely limit choice of crops and pasture plants.

These soils are not suited to use as sites for buildings and sanitary facilities. Flooding and wetness are too severe for these uses. Major flood control structures and pump-off systems are necessary.

7. Sharkey-Alligator-Tensas

Level to undulating, poorly drained and somewhat poorly drained soils that have a clayey surface layer and a clayey or clayey and loamy subsoil; formed in young and old Mississippi River alluvium

This map unit consists of soils in broad, level areas and in gently undulating and undulating areas on alluvial plains. The landscape consists mainly of long, smooth slopes of less than 1 percent. In some places, low, parallel ridges and swales have slopes of 0 to 5 percent. The soils in this map unit are occasionally flooded, generally from December through June. Flooding is by backwater in areas not protected by manmade levees and by excess water from local drainageways in areas protected by manmade levees.

This map unit makes up about 29 percent of the parish. It is about 56 percent Sharkey soils, 33 percent Alligator soils, 7 percent Tensas soils, and 4 percent soils of minor extent.

The Sharkey soils are poorly drained. They are in low positions on flood plains. The surface layer is dark grayish brown, medium acid clay. The subsoil is dark gray, slightly acid to mildly alkaline clay. The underlying material is gray and olive gray, neutral or mildly alkaline clay. In the Red River and Three Rivers Game Management Areas, a small area of Sharkey soils has a surface layer of reddish brown clay.

The Alligator soils are poorly drained. They are in low positions on flood plains, generally on the west side of Bayou Cocodrie. The surface layer is dark grayish brown, medium acid clay or silty clay loam. The subsoil is dark gray and gray, very strongly acid or strongly acid clay. The underlying material is gray, slightly acid clay.

The Tensas soils are somewhat poorly drained. They are on low ridges and in intermediate positions on natural levees. The surface layer is dark grayish brown, strongly acid silty clay. The upper part of the subsoil is grayish brown and dark grayish brown, very strongly acid clay and silty clay. The lower part of the subsoil is grayish brown, strongly acid clay loam. The underlying material is grayish brown, medium acid clay loam.

Of minor extent are Fausse, Tunica, Cocodrie, Crevasse, and Sostien soils. The very poorly drained Fausse soils are in deep swales and old channel scars and the poorly drained Tunica soils are on low ridges and in intermediate positions on natural levees. The Cocodrie, Crevasse, and Sostien soils are adjacent to the Old River outflow channel. Also included are a few small areas of Sharkey soils that are subject to frequent or rare flooding.

The soils of this map unit are used mainly for crops and woodland. Soybeans is the main crop. Several large areas are in woodland that is used mainly for wildlife habitat. A small acreage is in pasture.

The soils in this map unit are somewhat poorly suited to cultivated crops and moderately well suited to pasture. Wetness, poor tilth, and the hazard of occasional flooding during the growing season are the main limitations. A surface drainage system is needed for crops and pasture. Planting dates are often delayed because of flooding and wetness.

These soils are well suited to use as woodland. The dominant trees are Nuttall oak, sugarberry, green ash, overcup oak, sweetgum, and water oak. Logging operations are generally limited to summer and fall months because of wetness and flooding during winter and spring.

The soils in this map unit are poorly suited to most urban uses. They are not suited to use as building sites. The main limitations are wetness, very slow permeability, and very high shrink-swell potential. Flooding is a hazard. Major flood control structures are necessary.

8. Norwood-Latanier

Gently undulating, well drained and somewhat poorly drained soils that have a loamy or clayey surface layer and a loamy or clayey and loamy subsoil; formed in Red River alluvium

This map unit consists of soils in high and intermediate positions on natural levees along the Red River. The landscape consists mainly of low ridges and swales. Relief is 1 to 3 feet and slope ranges from 0 to 3 percent. Soils in this map unit are occasionally flooded.

This map unit makes up less than 0.7 percent of the parish. It is about 71 percent Norwood soils, 21 percent Latanier soils, and 8 percent soils of minor extent.

The Norwood soils are well drained. They are in the highest positions on natural levees. The surface layer and subsoil are reddish brown, mildly alkaline silt loam. The underlying material is stratified, yellowish red and reddish brown, moderately alkaline and mildly alkaline silt loam and very fine sandy loam.

The Latanier soils are somewhat poorly drained. They are in intermediate positions on natural levees. The surface layer is dark reddish brown, mildly alkaline clay. The subsoil is dark reddish brown, mildly alkaline clay and silty clay. The underlying material is stratified, brown and strong brown, mildly alkaline silty clay loam, silt loam, and very fine sandy loam.

Of minor extent are the poorly drained Sharkey, overwash soils, in low positions on natural levees, and soils similar to the Norwood soils except that the subsoil contains less clay.

Most areas of this map unit are in woods that are used mainly for wildlife habitat. Small acreages are in crops or in pasture.

These soils are well suited to use as woodland. The predominant trees are eastern cottonwood, sugarberry, boxelder, American sycamore, and overcup oak. Productivity of eastern cottonwood is very high. Logging operations are limited by flooding and wet soil conditions in winter and early spring in some years.

The soils in this map unit are moderately well suited to crops and pasture. Gentle slopes and high fertility favor these uses. Wetness is a limitation in low areas. Land smoothing and a surface drainage system are needed in places. Occasional flooding during the growing season somewhat restricts choice of crops and pasture plants.

These soils are poorly suited to most urban uses. They are not suited to use as building sites. Wetness and the hazard of flooding are the main limitations. Major flood control structures are needed to protect these soils.

Broad Land Use Considerations

The soils in Concordia Parish vary widely in their suitability for major land uses. About 61 percent of the land is used for cultivated crops, mainly soybeans. The cropland is located throughout the parish. It is the major land use in all general soil map units except map units 5, 6, and 8. These map units are mainly in woodland.

The most highly productive soils are in general soil map units 1 and 2. The principal soils in map units 1 and 2 are in the Commerce, Bruin, Dundee, and Baldwin series. These soils, with the exception of Baldwin, are loamy throughout. The Baldwin soils have a clayey subsoil. These soils have high or medium fertility, and they are well suited to most crops. Wetness is the major limitation to growing crops.

Soils in general soil map units 3, 4, 7, and 8 are moderately well suited or somewhat poorly suited to most crops. The principal soils in map units 3, 4, and 7 are in the Sharkey, Alligator, Tensas, Dundee, and Tunica series. Wetness and poor tilth are the major limitations to growing crops. Flooding is an additional hazard in map unit 7. Flooding is the main limitation to growing crops on the Norwood and Latanier soils of map unit 8. The soils in map units 5 and 6 are poorly suited to most crops because of frequent flooding.

About 2 percent of the land in the parish is used as pasture. The soils in general soil map units 1 and 2 are well suited to pasture and have few limitations to this use. Soils in map units 3, 4, 7, and 8 are moderately well suited for use as pasture. Wetness is the main limitation in units 3, 4, and 7. Flooding is a hazard in map units 7 and 8. The soils in map units 5 and 6 are poorly suited to pasture because of frequent flooding.

About 32 percent of the land in the parish is in woodland. All soils in the parish, except those in map units 5 and 6, are well suited to this use. The soils in map units 5 and 6 are moderately well suited to use as commercial forestland. The main limitation is the hazard of frequent flooding. Some of the soils have moderate or severe equipment use limitations that can be overcome by using special equipment or by logging during dry periods.

About 10,650 acres in the parish are in urban or built-up areas. The soils in map units 1 and 2 are moderately well suited for urban uses. The main soils in these units are in the Commerce, Bruin, Dundee, and Baldwin series. The major soil limitations for urban use are wetness and slow and very slow permeability. Low strength is a limitation for roads and streets. The soils in map units 3, 4, 5, 6, 7, and 8 are poorly suited or unsuited to urban uses. Wetness, high and very high shrink-swell potential, slow and very slow permeability, and the hazard of flooding are the main limitations of most soils in these map units.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Sharkey clay is one of several phases in the Sharkey series.

Some map units are made up of two or more major soils. These map units are called soil complexes, soil associations, or undifferentiated groups.

A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Tensas-Alligator complex, undulating complex is an example.

A *soil association* is made up of two or more geographically associated soils that are shown as one unit on the maps. Because of present or anticipated soil uses in the survey area, it was not considered practical or necessary to map the soils separately. The pattern and relative proportion of the soils are somewhat similar. Sostien-Cocodrie association, occasionally flooded is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils in a mapped area are not uniform. An area can be made up of only one of the major soils, or it can be made up of all of them. Newellton and Sharkey soils, frequently flooded is an undifferentiated group in this survey area.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description.

On the detailed soil maps all of the soil areas in Concordia Parish are mapped at the same level of detail, except for some areas that are frequently flooded and some areas that are state-owned and reserved for use as public wildlife management areas. Poor accessibility limited the number of observations that could be made in most of the areas. In addition, wetness from flooding, and public ownership limit the use and management of these soils, and separating all of the soils in those areas would be of little importance to the land user.

The boundaries of map units in Concordia Parish were matched whenever possible with those of the published survey of Tensas Parish, Louisiana, and Adams County, Mississippi. In a few places, the lines do not join, and there are some differences in the names of the map units. These differences result mainly from changes in soil series concepts, differences in map unit design, and changes in soil patterns near survey area boundaries.

Table 5 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

Aa—Alligator clay. This is a level, poorly drained soil in low positions on natural levees along old channels of the Mississippi River and its distributaries. The areas range from about 25 to 1,500 acres. Slope is less than 1 percent.

Typically, the surface layer is dark grayish brown, medium acid clay about 5 inches thick. The subsoil is gray and dark gray, very strongly acid or strongly acid clay. The underlying material to a depth of about 65 inches is gray, slightly acid clay.

Included in mapping are a few small areas of Baldwin, Sharkey, and Tensas soils. The Baldwin and Tensas soils are in slightly higher positions than the Alligator soil and contain less clay in the subsoil. Sharkey soils are in slightly lower positions and are less acid in the subsoil. Also included are a few small areas of Alligator soils on gently undulating slopes and small areas of a soil that has a subsoil that is medium acid to neutral between depths of 20 and 60 inches. The included soils make up about 10 percent of the map unit.

This Alligator soil has medium fertility. Water and air move through this soil very slowly. Water runs off the surface at a slow rate and ponds in low places for long periods after heavy rains. Flooding is rare, but it can occur during periods of unusually prolonged, high intensity rainfall at any time of the year. A seasonal high water table is about 6 inches to 2 feet below the surface from January through April in most years. Adequate water is available to plants in most years. The surface layer of this soil is very sticky when wet, and it dries slowly. This soil has very high shrink-swell potential.

This soil is mainly used for cultivated crops or as woodland. In a few areas it is used as pasture.

This soil is moderately well suited to cultivated crops. Wetness, very slow permeability, and poor tilth are the main limitations. Soybeans is the main crop; rice, grain sorghum, and wheat are also grown. This soil is difficult to keep in good tilth. It can be worked only within a narrow range of moisture content. It becomes cloddy if tilled when it is too wet or too dry. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Minimum tillage and crop residue left on the soil or regular additions of other organic matter improve fertility and help to maintain soil tilth and the content of organic matter. Pipe outlets or drop structures installed in drainage ditches control the water level in ricefields and prevent excessive erosion of ditches.

This soil is well suited to southern hardwoods. The main concerns in producing and harvesting timber are wetness and the clayey surface layer, which limit the use of equipment during wet periods. Conventional methods of harvesting can be used except sometimes during rainy periods, generally from December to April. Only trees that can tolerate seasonal wetness, such as eastern cottonwood, American sycamore, and sweetgum, should be planted.

This soil is moderately well suited to pasture. The main limitations are wetness and very slow permeability. The main suitable pasture plants are common bermudagrass, improved bermudagrass, tall fescue, dallisgrass, ryegrass, and white clover. Shallow drains can remove excess surface water. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Fertilizer is needed for optimum growth of grasses and legumes. Lime generally is needed.

This soil is poorly suited to urban uses, including building sites, local roads and streets, and most sanitary facilities. Wetness, very slow permeability, and very high shrink-swell potential are the main limitations. Flooding is a hazard. Low strength is a severe limitation for local roads and streets. Excess water can be removed by using shallow ditches and providing the proper grade. Because of wetness and very slow permeability, septic tank absorption fields do not function properly during rainy periods unless internal drainage is improved. Sewage lagoons are needed if this soil is used as homesites. Designs for roads should offset the limitation of the soil to support a load. The effects of shrinking and swelling can be minimized by proper design and by backfilling with material that has low shrink-swell potential.

This Alligator soil is in capability subclass IIIw and in woodland group 2w.

Ab—Alligator clay, occasionally flooded. This is a level, poorly drained soil in low positions on natural levees of old channels of the Mississippi River and its distributaries. The soil is subject to occasional flooding for brief to long periods. The areas range from about 25 to 1,200 acres. Slope is less than 1 percent.

Typically, the surface layer is dark grayish brown, very strongly acid clay about 5 inches thick. The subsoil is dark gray and gray, very strongly acid or strongly acid clay. The underlying material to a depth of about 60 inches is gray, slightly acid clay.

Included in mapping are a few small areas of Fausse, Sharkey, and Tensas soils. The very poorly drained Fausse soils are in depressional areas and do not crack so deeply during dry periods as Alligator soil. The Sharkey soils are in slightly lower positions than Alligator soil and are less acid in the subsoil. The Tensas soils are in higher positions and have a loamy underlying material. Also included are small areas of Alligator soils that are rarely flooded and frequently flooded and small areas of a soil that has a subsoil that is medium acid to neutral between depths of 20 and 60 inches. The included soils make up about 10 percent of the map unit.

This Alligator soil has medium fertility. Water and air move through this soil very slowly. Water runs off the surface slowly and stands in low places for long periods after heavy rains. A seasonal high water table is about 6 inches to 2 feet below the surface from January through April of most years. Adequate water is available to plants in most years. This soil is subject to flooding for brief to long periods late in winter, in spring, and early in summer. Flooding occurs about 3 times during each 15 year period during the crop growing season and more often during the winter months. Floodwaters typically are 2 to 5 feet deep, but the depth exceeds 8 feet in places. Flood duration can be as long as 1 month. This soil has very high shrink-swell potential.

This soil is mostly used for cultivated crops, mainly soybeans. Other crops are rice, grain sorghum, and wheat. In some areas, this soil is used as woodland, pasture, or for wildlife habitat.

This soil is somewhat poorly suited to most cultivated crops. The main limitations are wetness and poor tilth. Flooding is a hazard. This soil is best suited to short-season crops because wetness delays planting in most years and late spring flooding damages crops in some years. Flooding can be controlled by levees and by water pumps. This soil is difficult to keep in good tilth. It can be worked only within a narrow range of moisture content. It becomes cloddy if tilled when it is too wet or too dry. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Tilth can be maintained and fertility can be improved by returning crop residue to the soil. Most crops respond well to fertilizer. Lime generally is needed.

This Alligator soil is well suited to southern hardwoods. The main concerns in producing and harvesting timber are flooding, wetness, and the clayey surface layer. The texture of the surface layer limits equipment use during wet periods. Conventional methods of harvesting can be used except sometimes during rainy periods, generally from December to April. Reforestation must be carefully managed to reduce competition from undesirable understory plants. Only trees that can tolerate seasonal wetness, such as eastern cottonwood, American sycamore, and sweetgum should be planted.

This Alligator soil is somewhat poorly suited to pasture. The main limitations are wetness and very slow permeability. Flooding is a hazard. Common bermudagrass is the main pasture plant. Shallow ditches can remove excess surface water. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition.

This soil is moderately well suited to habitat for woodland wildlife and well suited to habitat for wetland wildlife. Propagation of oaks and other mast-producing trees improves the habitat for squirrels, white-tailed deer, and many species of nongame birds. Habitat for wetland wildlife can be improved by constructing shallow ponds to provide open areas for waterfowl and furbearers.

This map unit is poorly suited to most urban uses, and it is not suited to use as building sites. The main limitations are wetness, very slow permeability, and very high shrink-swell potential. Flooding is a hazard. Major flood control structures and extensive local drainage systems are needed to protect this soil. Excess surface water can be removed by using shallow ditches and providing the proper grade. Because of wetness and very slow permeability, septic tank absorption fields do not function properly during rainy periods unless internal drainage is improved. Sewage lagoons are needed if this soil is used as homesites. Lagoon levees should be of sufficient height to prevent floodwater from entering the lagoon. Designs for roads should offset the limitation of the soil to support a load. The effects of shrinking and swelling can be minimized by proper design and by backfilling with material that has low shrink-swell potential.

This Alligator soil is in capability subclass IVw and in woodland group 2w.

Ac—Alligator clay, gently undulating, occasionally flooded. This is a poorly drained soil on parallel, low ridges and swales near old channels of the Mississippi River and its distributaries. The ridges are 2 to 5 feet high and 150 to 350 feet wide. The swales are about 75 to 150 feet wide. This soil is subject to occasional flooding for brief to long periods. The areas range from about 50 to 500 acres. Slopes are short and choppy and range from 0 to 3 percent.

Typically, the surface layer is dark grayish brown, strongly acid clay about 7 inches thick. The subsoil is dark gray, very strongly acid or strongly acid clay. The underlying material to a depth of about 60 inches is gray, neutral clay.

Included in mapping are a few small areas of Fausse, Sharkey, and Tensas soils. The very poorly drained Fausse soils are in low positions in swales and do not crack so deeply during dry periods as Alligator soil. The Sharkey soils are in slightly lower positions than Alligator soil and are less acid in the subsoil. The Tensas soils are in higher positions and have a loamy subsoil. Also included are small areas of a soil that has a subsoil that is medium acid to neutral between depths of 20 and 60 inches and a few small areas of Alligator soils that have short slopes of 3 to 5 percent. A few small areas of Alligator soil only rarely flood. The included soils make up about 10 percent of the map unit.

This Alligator soil has medium fertility. Water and air move through this soil very slowly. Water runs off the surface slowly and stands in low places for long periods after heavy rains. A seasonal high water table is about 6 inches to 2 feet below the surface from January through April of most years. Adequate water is available to plants in most years. This soil is subject to flooding for brief to long periods late in winter, in spring, and early in summer. Flooding occurs about three times during each 15 year period during the crop growing season and more often during the winter. Floodwater typically is 2 to 5 feet deep, but the depth exceeds 8 feet in places. Flood duration is as long as 1 month. This soil has very high shrink-swell potential.

This soil is mostly used for cultivated crops, mainly soybeans. Other crops are grain sorghum and wheat. In a few areas this soil is used as woodland, pasture, or for wildlife habitat.

This Alligator soil is somewhat poorly suited to most cultivated crops. Wetness, irregular slopes, and poor tilth are the main limitations. Flooding is a hazard. Short-season crops can be grown in most years; however, flooding can delay planting dates. Levees and water pumps can control flooding. This soil is difficult to keep in good tilth. It can be worked only within a narrow range of moisture content. It becomes cloddy if tilled when it is too wet or too dry. Irregular slopes hinder tillage operations. Land grading and smoothing improve surface drainage, but in places, large volumes of soil need to be moved. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Tilth and fertility can be improved by returning crop residue to the soil.

This soil is well suited to southern hardwoods. The main concerns in producing and harvesting timber are flooding, wetness, and the clayey surface layer. The texture of the surface layer limits equipment use during wet periods. Conventional methods of harvesting can be used except sometimes during rainy periods, generally from December to April. Reforestation must be carefully managed to reduce competition from undesirable understory plants. Only trees that can tolerate seasonal wetness, such as eastern cottonwood, American sycamore, and sweetgum, should be planted.

This Alligator soil is somewhat poorly suited to pasture. The main limitations are wetness and very slow permeability. Flooding is a hazard. Common bermudagrass is the main suitable pasture plant. Shallow drains can remove excess surface water. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Fertilizer is needed for optimum production of grasses and legumes. Lime generally is needed.

This soil is moderately well suited to habitat for woodland wildlife and well suited to habitat for wetland wildlife. Propagation of oaks and other mast-producing trees improves the habitat for squirrels, white-tailed deer, and many species of nongame birds. Habitat for wetland wildlife can be improved by constructing shallow ponds to provide open areas for waterfowl and furbearers.

This map unit is poorly suited to urban uses, including building sites. The main limitations are wetness, very slow permeability, and very high shrink-swell potential. Flooding is a hazard. Major flood control structures and extensive local drainage systems are needed to protect this soil. Excess water can be removed by using shallow ditches and providing the proper grade. Because of wetness and very slow permeability, septic tank absorption fields do not function properly during rainy periods unless internal drainage is improved. Sewage lagoons are needed if this soil is used as homesites. Lagoon levees should be of sufficient height to prevent floodwaters from entering the lagoon. Designs for roads should offset the limitation of the soil to support a load. The effects of shrinking and swelling can be minimized by proper design and by backfilling with material that has low shrink-swell potential.

This Alligator soil is in capability subclass IVw and in woodland group 2w.

Ba—Baldwin silty clay loam. This is a level, poorly drained soil in intermediate positions on natural levees along old, former channels of the Mississippi River and its distributaries. The areas are long and narrow and range from 10 to 300 acres. Slope is less than 1 percent.

Typically, the surface layer is very dark grayish brown, medium acid, silty clay loam about 7 inches thick. The subsoil is dark gray, medium acid or slightly acid silty clay in the upper part; olive gray, neutral silty clay loam in the middle part; and dark gray, neutral silty clay in the lower part. The underlying material to a depth of about 71 inches is olive gray, mildly alkaline silty clay and silty clay loam.

Included in mapping are a few small areas of Alligator, Dundee, Sharkey, and Tensas soils. The Alligator and Sharkey soils are in lower positions than Baldwin soil and contain more clay in the subsoil. The Dundee soils are in slightly higher positions and are loamy throughout. The Tensas soils are in slightly lower positions and are more acid in the lower part of the subsoil. Also included are a few small areas of Baldwin soils that have a dark grayish brown silt loam surface layer. The included soils make up about 10 percent of the map unit.

This Baldwin soil has high fertility. Water and air move through the soil very slowly. Water runs off the surface slowly and stands in low places for long periods after heavy rains. The surface layer of this soil is somewhat difficult to keep in good tilth, especially where cultivation has mixed some of the clayey subsoil into the plow layer. Adequate water is available to plants in most years. A seasonal high water table fluctuates between a depth of about 2 feet and the soil surface from December through April. Flooding is rare, but it can occur during periods of intense, prolonged rainfall at any time during the year. This soil has very high shrink-swell potential.

This soil is mostly used for cultivated crops, mainly soybeans and cotton. In a few areas, it is used as pasture, woodland, or homesites.

This Alligator soil is moderately well suited to cultivated crops. Wetness and very slow permeability are the main limitations. Soybeans, cotton, rice, wheat, corn, and grain sorghum are suitable crops. This soil is somewhat difficult to keep in good tilth. It can be worked only within a narrow range of moisture content. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Proper irrigation systems are needed for rice production. Crop residue left on or near the surface helps conserve moisture, maintain tilth, and control erosion. Most crops and pasture plants respond well to fertilizer. Lime generally is not needed.

This soil is well suited to pasture. The main limitations are wetness and very slow permeability. Common bermudagrass, improved bermudagrass, dallisgrass, ryegrass, tall fescue, and white clover are suitable pasture plants. Shallow ditches can remove excess surface water. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Nitrogen fertilizer is needed for optimum forage production.

This soil is well suited to use as woodland. Most areas, however, have been cleared for crops or pasture. The potential for production of southern hardwoods is very high. The main concern in producing and harvesting timber is wetness. Trees suitable for planting are eastern cottonwood, American sycamore, and sweetgum.

This soil is poorly suited to urban uses. The main limitations are wetness, very slow permeability, and very high shrink-swell potential. Flooding is a hazard. Excess water can be removed by using shallow ditches and providing the proper grade. Because of wetness and very slow permeability, septic tank absorption fields do not function properly during rainy periods unless internal drainage is improved. Sewage lagoons are needed if this soil is used as homesites. Designs for roads should offset the limitation of the soil to support a load. The effects of shrinking and swelling can be minimized by proper design and by backfilling with material that has low shrink-swell potential.

This Baldwin soil is in capability subclass IIIw and in woodland group 2w.

Bn—Bruin silt loam. This is a level, moderately well drained soil on the highest elevations of natural levees of the Mississippi River. The areas are long and narrow and range from 5 to more than 500 acres. Slope is less than 1 percent.

Typically, the surface layer is dark grayish brown, slightly acid silt loam about 7 inches thick. In places the surface layer is very fine sandy loam. The subsoil is dark brown and brown, neutral or mildly alkaline silt loam and very fine sandy loam. The underlying material to a depth of about 65 inches is grayish brown and dark brown, neutral or slightly acid very fine sandy loam.

Included in mapping are a few small areas of Commerce and Newellton soils. These soils are somewhat poorly drained and are on slightly lower elevations of the natural levee than the Bruin soil. The Commerce soils contain more clay in the subsoil than Bruin soil, and the Newellton soils have a more clayey surface layer and subsoil. The included soils make up about 10 percent of the map unit.

This Bruin soil has high fertility. Water and air move through the soil at a moderate rate. Water runs off the surface at a medium rate and this soil dries quickly after rains. Flooding from stream overflow is controlled in most places by manmade levees. This soil has low shrink-swell potential. Plants are damaged by lack of water during dry periods in summer and in fall of some years.

This soil is mostly used as pasture or for cultivated crops, mainly soybeans and cotton. In a few areas, it is used as homesites.

This soil is well suited to cultivated crops and has few limitations for this use. Soybeans, cotton, corn, small grains, and vegetables are suitable crops. This soil is friable, easy to keep in good tilth, and can be worked throughout a wide range of moisture content. Traffic pans develop easily, but can be broken up by deep plowing or chiseling. Surface crusting and soil compaction can be reduced by returning crop residue to the soil and by minimum tillage. Most crops and pasture plants respond well to fertilizer. Lime generally is not needed.

This soil is well suited to pasture and has few limitations for this use. Common bermudagrass, improved bermudagrass, Pensacola bahiagrass, tall fescue, ryegrass, and white clover are the main suitable pasture plants. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Nitrogen fertilizer is needed for optimum forage production.

This soil is well suited to use as woodland. Most areas, however, have been cleared for use as cropland or pasture. The potential for production of southern hardwoods is very high. Trees suitable for planting are eastern cottonwood, American sycamore, and sweetgum.

This soil is well suited to urban uses. It has moderate limitations for septic tank absorption fields because of moderate permeability. This limitation can be overcome by increasing the size of the absorption field.

This Bruin soil is in capability class I and in woodland group 1o.

Br—Bruin silt loam, gently undulating. This is a moderately well drained soil in high positions on natural levees of the Mississippi River. The landscape consists of concave swales and low ridges. The ridges are 1 foot to 3 feet high and 75 to 250 feet wide. The swales are about 50 to 150 feet wide. The areas are irregular in shape and range from 10 to 500 acres. Slopes are generally short and choppy and range from 0 to 3 percent.

Typically, the surface layer is dark brown, slightly acid silt loam about 4 inches thick. In places the surface layer is very fine sandy loam. The subsoil is dark brown and brown, slightly acid silt loam and very fine sandy loam. The underlying material to a depth of about 60 inches is yellowish brown, neutral silt loam.

Included in mapping are a few small areas of Commerce and Newellton soils. The somewhat poorly drained Commerce soils are in slightly lower positions than Bruin soil, and they contain more clay in the subsoil. The somewhat poorly drained Newellton soils are in lower positions in some swales, and have a more clayey surface layer and subsoil than Bruin soil. Also included are a few small areas of Bruin soils that have slopes of 3 to 5 percent. The included soils make up about 10 percent of the map unit.

This Bruin soil has high fertility. Water and air move through this soil at a moderate rate. Water runs off the surface at a medium rate and it ponds in low places for short periods after heavy rains. Flooding from stream overflow is controlled in most places by manmade levees. This soil has low shrink-swell potential. Plants are damaged by lack of water during dry periods in summer and in fall of some years.

This soil is mainly used for cultivated crops or pasture. A small acreage is used as homesites.

This soil is well suited to cultivated crops. The main limitation is short, choppy slopes. The soil is subject to a moderate hazard of erosion. Soybeans is the main crop, but cotton, corn, small grains, and vegetables are also grown. This soil is friable, easy to keep in good tilth, and can be worked throughout a wide range of moisture content. Irregular slopes hinder tillage operations. Land grading and smoothing improve surface drainage and permit more efficient use of farm equipment. Traffic pans develop easily, but can be broken up by deep plowing or chiseling. Surface crusting and soil compaction can be reduced by returning crop residue to the soil and by minimum tillage. Runoff and erosion can be reduced by plowing in fall and by fertilizing and seeding to a cover crop.

This soil is well suited to pasture and has few limitations for this use. Common bermudagrass, improved bermudagrass, Pensacola bahiagrass, tall fescue, ryegrass, and white clover are the main suitable pasture plants. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Nitrogen fertilizer is needed for optimum forage production. Lime generally is not needed.

This soil is well suited to use as woodland. Most areas, however, have been cleared for use as cropland or pasture. The potential for production of southern hardwoods is very high. Trees suitable for planting are eastern cottonwood, American sycamore, and sweetgum.

This soil is well suited to most urban uses. It has moderate limitations for septic tank absorption fields because of moderate permeability. This limitation can be overcome by increasing the size of the absorption field.

This Bruin soil is in capability subclass IIe and in woodland group 1o.

Bu—Bruin silt loam, occasionally flooded. This is a level, moderately well drained soil in high positions on natural levees of the Mississippi River. It is subject to occasional flooding for brief to long periods. The areas are long and narrow and range from 20 to more than 100 acres. Slope is less than 1 percent.

Typically, the surface layer is dark brown, slightly acid silt loam about 8 inches thick. In places the surface layer is very fine sandy loam. The subsoil is dark brown and dark yellowish brown, neutral very fine sandy loam. The underlying material to a depth of about 75 inches is grayish brown and dark brown, mildly alkaline silt loam and very fine sandy loam.

Included in mapping are a few small areas of Commerce and Newellton soils that are in slightly lower positions than Bruin soil. The Commerce soils contain more clay in the subsoil and the Newellton soils have a more clayey surface layer and subsoil. Also included are a few small areas of Bruin soils that have slopes of 1 to 3 percent, and Bruin soils that flood only rarely. The included soils make up about 10 percent of the map unit.

This Bruin soil has high fertility. Water and air move through this soil at a moderate rate. Water runs off the surface at a medium rate. This soil is subject to flooding for brief to long periods, ranging from a few days to one month late in winter, in spring, and early in summer. Flooding occurs about 2 times during each 15 year period during the crop growing season. It may be more frequent at other times of the year. This soil has low shrink-swell potential. Plants are damaged by lack of water during dry periods in summer and in fall of some years.

This soil is mainly used for cultivated crops or pasture. In a few areas, it is used as homesites.

This soil is moderately well suited to cultivated crops. The main limitation is wetness from occasional flooding. Soybeans is the main crop, but cotton, corn, small grains, and vegetables are also grown. This soil is friable, easy to keep in good tilth, and can be worked throughout a wide range of moisture content. Flooding may delay planting or harvesting in some years, but it can be controlled by levees, channels, and pumps. Traffic pans develop easily, but can be broken up by deep plowing or chiseling. Surface crusting and soil compaction can be reduced by returning crop residue to the soil and by minimum tillage. Most crops and pasture plants respond well to fertilizer. Lime generally is not needed.

This soil is moderately well suited to pasture, but occasional flooding is a hazard. Common bermudagrass is the main suitable pasture plant. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Nitrogen fertilizer is needed for optimum forage production.

This soil is well suited to use as woodland. Most areas, however, have been cleared for use as cropland or pasture. The potential for production of southern hardwoods is very high. Trees suitable for planting are eastern cottonwood, American sycamore, and sweetgum.

This soil is poorly suited to most urban uses. It is not suitable for use as building sites. Occasional flooding is a hazard, but flooding can be controlled by major flood control structures.

This Bruin soil is in capability subclass IIw and in woodland group 1o.

Bw—Bruin-Tunica complex, gently undulating. These moderately well drained and poorly drained soils are in high positions on natural levees of the Mississippi River. The landscape consists of low, convex ridges and shallow, concave swales. The ridges are 1 foot to 3 feet high and about 150 to 300 feet wide. The swales are about 50 to 275 feet wide. The moderately well drained Bruin soil is on ridges, and the poorly drained Tunica soil is in swales and on lower side slopes. Slopes are generally short and choppy. They range from about 1 percent in the swales to about 3 percent of the ridges.

The areas of this complex range from 50 to 550 acres and are about 45 percent Bruin soil and about 35 percent Tunica soil. The soils were so intricately intermingled that it was not practical to map them separately.

Typically, the Bruin soil has a surface layer of dark grayish brown, medium acid silt loam about 6 inches thick. In places the surface layer is silty clay loam. The subsoil is brown and dark brown, slightly acid silt loam. The underlying material to a depth of about 60 inches is brown, neutral or mildly alkaline silt loam.

The Bruin soil has high fertility. Water and air move through this soil at a moderate rate. Runoff is medium, and the hazard of erosion is moderate. The soil dries quickly after rains. It has low shrink-swell potential. Plants are damaged by lack of water during dry periods in summer and in fall of some years.

Typically, the Tunica soil has a surface layer of very dark grayish brown, medium acid clay about 5 inches thick. In places the surface layer is silt loam or silty clay loam. The subsoil is dark gray, slightly acid clay. The underlying material to a depth of about 60 inches is dark grayish brown, neutral silty clay loam or mildly alkaline silt loam.

The Tunica soil has high fertility. Water and air move through this soil very slowly. Water runs off the surface slowly and ponds in low places for long periods after heavy rains. Adequate water is available to plants in most years. A seasonal high water table is about 1.5 to 3 feet below the surface from January through April. This soil is subject to rare flooding during prolonged, high-intensity storms. This can occur any time during the year. This soil has high shrink-swell potential.

Included in mapping are a few small areas of Commerce, Fausse, Newellton, and Sharkey soils. The somewhat poorly drained Commerce soils are in level positions on some ridges and contain more clay in the subsoil than Bruin soil. The very poorly drained Fausse soils are in low positions in some swales and remain wet throughout most years. Newellton soils are on upper side slopes of ridges and in shallow swales and they have a thinner clayey subsoil than Tunica soil, underlain by a loamy material. The Sharkey soils are in some swales, and they are clayey throughout. The included soils make up about 20 percent of the map unit.

This map unit is mainly used for cultivated crops or pasture. Small acreages are used as homesites, woodland, or oil fields.

The soils of this map unit are moderately well suited to cultivated crops. Wetness and short, choppy slopes are the main limitations. Soybeans is the main crop, but cotton, corn, small grains, and vegetables are also grown. Bruin soil, on ridges, is friable and easy to keep in good tilth. Traffic pans develop easily but can be broken up by deep plowing or chiseling. Tunica soil, in swales, is difficult to keep in good tilth. It is sticky when wet and hard when dry, and it becomes cloddy if it is tilled when it is too wet or too dry. Most cultivated crops and pasture plants need a drainage system. Land grading and smoothing remove excess water, but in places, large volumes of soil need to be moved. Minimum tillage and crop residue returned to the soil or regular additions of other organic matter improve fertility and help to maintain soil tilth and content of organic matter.

The soils of this map unit are well suited to pasture. The main limitation is wetness. Common bermudagrass, improved bermudagrass, dallisgrass, tall fescue, and white clover are suitable pasture plants. Ryegrass and other small grains can be grown for winter pasture. Shallow ditches can remove excess surface water. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Nitrogen fertilizer is needed for optimum forage production. Lime generally is not needed.

These soils are well suited to eastern cottonwood, American sycamore, and sweetgum. Wetness in the Tunica soil is the main concern in producing and harvesting timber. Conventional methods of harvesting can be used except sometimes during rainy periods, generally from December to April. Reforestation must be carefully managed to reduce competition from undesirable understory plants. Competing vegetation can be controlled by proper site preparation and by spraying, cutting, or girdling to eliminate unwanted weeds, brush, or trees.

The soils of this map unit are somewhat poorly suited to urban uses. If buildings are constructed, Bruin soil is more suitable for this use. It has few limitations. If the Tunica soil is used as homesites the main limitations are wetness, very slow permeability, and very high shrink-swell potential. Flooding is a hazard. A drainage system and addition of loamy fill material can improve the Tunica soil for most urban uses. The effects of shrinking and swelling in the Tunica soil can be minimized by proper design and by backfilling with material that has low shrink-swell potential.

Bruin soil is in capability subclass IIe and Tunica soil is in capability subclass IIIw. Bruin soil is in woodland group 1o and Tunica soil is in 2w.

Ca—Commerce silt loam. This is a level, somewhat poorly drained soil in high positions on natural levees of the Mississippi River. The areas generally are long and narrow and range from 10 to more than 150 acres. Slope is less than 1 percent.

Typically, the surface layer is dark grayish brown, neutral silt loam about 5 inches thick. The subsoil is grayish brown, mildly alkaline or moderately alkaline silt loam. The underlying material to a depth of about 60 inches is grayish brown and dark grayish brown, mildly alkaline or moderately alkaline silt loam and silty clay loam. In places the underlying material is clay or silty clay between depths of 20 and 60 inches.

Included in mapping are a few small areas of Bruin, Newellton, and Sharkey soils. The moderately well drained Bruin soils are in slightly higher positions and have less clay in the subsoil than Commerce soil. The somewhat poorly drained Newellton soils and the poorly drained Sharkey soils are in lower positions, and have a more clayey subsoil. Also included are a few small areas of Commerce silty clay loam soils. The included soils make up about 10 percent of the map unit.

This Commerce soil has high fertility. Water and air move through this soil at a moderately slow rate. Water runs off the surface slowly. Adequate water is available to plants in most years. A seasonal high water table is about 1.5 to 4 feet below the surface from December through April. Flooding from stream overflow is controlled in most places by manmade levees. Shrink-swell potential is moderate.

This soil is mainly used for cultivated crops or pasture. Small acreages are used as homesites or woodland.

This soil is well suited to cultivated crops. Wetness is the main limitation. Soybeans is the main crop, but cotton, corn, small grains, and vegetables are also grown. This soil is friable, easy to keep in good tilth, and can be worked throughout a wide range of moisture content. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Traffic pans develop easily but can be broken up by deep plowing or chiseling. Surface crusting and soil compaction can be reduced by returning crop residue to the soil and by minimum tillage. Most crops and pasture plants respond well to fertilizer. Lime generally is not needed.

This Commerce soil is well suited to pasture. The main limitation is wetness. Common bermudagrass, improved bermudagrass, Pensacola bahiagrass, tall fescue, ryegrass, and white clover are the main suitable pasture plants. Shallow ditches can remove excess surface water. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Nitorgen fertilizer is needed for optimum forage production. Lime generally is not needed.

This soil is well suited to use as woodland, but most areas have been cleared for use as cropland or pasture. The potential for production of southern hardwoods is very high. Trees suitable for planting are eastern cottonwood and American sycamore. Wetness limits equipment use somewhat during the winter and spring.

This soil is moderately well suited to urban uses. It has moderate to severe limitations for building sites, local roads and streets, and most sanitary facilities. The main limitations are wetness and low strength as it applies to local roads and streets. Excess water can be removed by using shallow ditches and providing the proper grade. Designs for roads should offset the limitation of the soil to support a load. Because of wetness and moderately slow permeability, septic tank absorption fields do not function properly during rainy periods unless internal drainage is improved.

This Commerce soil is in capability subclass IIw and in woodland group 1w.

Cb—Commerce silt loam, gently undulating. This is a gently undulating, somewhat poorly drained soil in high positions on natural levees of the Mississippi River. The landscape consists of concave swales and low ridges. The ridges are 1 foot to 3 feet high and about 75 to 250 feet wide. The swales are about 50 to 150 feet wide. Slopes are generally short and choppy and range from 0 to 3 percent.

Typically, the surface layer is dark grayish brown, slightly acid silt loam about 5 inches thick. The subsoil is dark grayish brown, neutral silt loam. In places the subsoil is clay or silty clay between depths of 20 and 75 inches. The underlying material to a depth of about 75 inches is grayish brown and dark grayish brown, neutral or mildly alkaline silt loam and very fine sandy loam.

Included in mapping are a few small areas of Bruin, Newellton, Sharkey, and Tunica soils. The moderately well drained Bruin soils are on some higher ridges and contain less clay in the subsoil than Commerce soil. The Newellton, Sharkey, and Tunica soils are in some deeper swales, and they have a more clayey subsoil. Also included are a few small areas of Commerce silty clay loam soils. The included soils make up about 10 percent of the map unit.

This Commerce soil has high fertility. Water and air move through this soil at a moderately slow rate. Water runs off the surface slowly and stands in low places for short periods after heavy rains. Adequate water is available to plants in most years. A seasonal high water table is about 1.5 to 4 feet below the surface from December through April. Flooding from stream overflow is controlled in most places by manmade levees. Shrink-swell potential is moderate.

This soil is mainly used for cultivated crops or as pasture. Small acreages are used as homesites or woodland.

This soil is well suited to cultivated crops. This use is limited mainly by wetness and short, choppy slopes. Soybeans is the main crop, but cotton, corn, small grains, and vegetable crops are also grown. This soil is friable and easy to keep in good tilth. It can be worked throughout a wide range of moisture content. Irregular slopes hinder tillage operations. Land grading and smoothing improve surface drainage and permit more efficient use of farm equipment. Traffic pans develop easily but can be broken up by deep plowing or chiseling. Surface crusting and soil compaction can be reduced by returning crop residue to the soil and by minimum tillage. Runoff and erosion can be reduced by plowing in fall and by fertilizing and seeding to a cover crop.

This Commerce soil is well suited to pasture. The main limitation is wetness. Common bermudagrass, improved bermudagrass, Pensacola bahiagrass, tall fescue, ryegrass, and white clover are the main suitable pasture plants. Shallow ditches can remove excess surface water. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Nitrogen fertilizer is needed for optimum forage production. Lime generally is not needed.

This soil is well suited to use as woodland, but most areas have been cleared for use as cropland or pasture. The potential for production of southern hardwoods is very high. Trees suitable for planting are eastern cottonwood and American sycamore. Wetness somewhat limits equipment use during the winter and spring.

This soil is moderately well suited to urban uses. It has moderate to severe limitations for building sites, local roads and streets, and most sanitary facilities. The main limitations are wetness, and low strength as it applies to local roads and streets. Excess water can be removed by using shallow ditches and providing the proper grade. Because of wetness and moderately slow permeability, septic tank absorption fields do not function properly during rainy periods unless internal drainage is improved.

This Commerce soil is in capability subclass IIw and in woodland group 1w.

Cc—Commerce silt loam, occasionally flooded. This is a level, somewhat poorly drained soil in high positions on natural levees of the Mississippi River. It is subject to occasional flooding for brief to long periods. The areas are long and narrow and range from 20 to more than 100 acres. Slope is less than 1 percent.

Typically, the surface layer is dark grayish brown, neutral silt loam about 5 inches thick. The subsoil is grayish brown, neutral silt loam. In places the subsoil is clay or silty clay between depths of 20 and 60 inches. The underlying material to a depth of about 60 inches is grayish brown, mildly alkaline silty clay loam and silt loam.

Included in mapping are a few small areas of Bruin, Newellton, and Sharkey soils. The moderately well drained Bruin soils are in slightly higher positions than Commerce soil, and they contain less clay in the subsoil. The somewhat poorly drained Newellton and poorly drained Sharkey soils are in lower positions, and they are more clayey than Commerce soil. Also included are a few small areas of Commerce silty clay loam and Commerce soils that have slopes of 1 to 3 percent. The included soils make up about 10 percent of the map unit.

This Commerce soil has high fertility. Water and air move through this soil at a moderately slow rate. Water runs off the surface slowly. Adequate water is available to plants in most years. A seasonal high water table is about 1.5 to 4 feet below the surface from December through April. This soil is subject to flooding for brief to long periods ranging from a few days to 1 month late in winter, in spring, and early in summer. Flooding occurs about 2 times during each 15 year period during the crop growing season. It may be more frequent during the winter months. Shrink-swell potential is moderate.

This soil is mainly used for cultivated crops or pasture. In a few areas, it is used as woodland or as homesites.

This soil is moderately well suited to cultivated crops. Wetness is the main limitation. Flooding is a hazard. Soybeans is the main crop, but cotton, corn, small grains, and vegetables are also grown. This soil is friable, easy to keep in good tilth, and can be worked throughout a wide range of moisture content. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Flooding may delay planting or harvesting in some years, but it can be controlled by levees, channels, and pumps. Traffic pans develop easily but can be broken up by deep plowing or chiseling. Surface crusting and soil compaction can be reduced by returning crop residue to the soil and by minimum tillage. Most crops and pasture plants respond well to fertilizer. Lime generally is not needed.

This Commerce soil is moderately well suited to pasture. The main limitations are wetness and the hazard of occasional flooding. Common bermudagrass, improved bermudagrass, Pensacola bahiagrass, tall fescue, ryegrass, and white clover are the main suitable pasture plants. Shallow ditches can remove excess surface water. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Nitrogen fertilizer is needed for optimum forage production.

This soil is well suited to southern hardwoods. It has few limitations for use and management. Trees suitable for planting are eastern cottonwood and American sycamore.

This soil is poorly suited to most urban uses. It is not suitable for building sites. The main limitation is wetness.

Occasional flooding is a hazard. Flooding can be controlled by major flood control structures. Excess water can be removed by using shallow ditches and providing the proper grade. Because of wetness and moderately slow permeability, septic tank absorption fields do not function properly during rainy periods unless internal drainage is improved.

This Commerce soil is in capability subclass IIIw and in woodland group 1w.

Cm—Commerce silty clay loam. This is a level, somewhat poorly drained soil in high and intermediate positions on natural levees of the Mississippi River. The areas generally are long and narrow and range from 10 to more than 150 acres. Slope is less than 1 percent.

Typically, the surface layer is dark grayish brown, slightly acid silty clay loam about 4 inches thick. The subsoil is dark grayish brown, neutral silty clay loam and grayish brown, neutral silt loam. The underlying material to a depth of about 60 inches is grayish brown, mildly alkaline silt loam. In places the subsoil is clay or silty clay between depths of 20 and 60 inches.

Included in mapping are a few small areas of Bruin, Newellton, and Sharkey soils. The moderately well drained Bruin soils are in slightly higher positions than Commerce soil, and they contain less clay in the subsoil. The somewhat poorly drained Newellton soils and the poorly drained Sharkey soils are in lower positions, and they have a more clayey subsoil. Also included are a few small areas of Commerce silt loam. The included soils make up about 10 percent of the map unit.

This Commerce soil has high fertility. Water and air move through this soil at a moderately slow rate. Water runs off the surface slowly and stands in low places for short periods after heavy rains. Adequate water is available to plants in most years. A seasonal high water table is about 1.5 to 4 feet below the soil surface from December through April. Flooding from stream overflow is controlled in most places by manmade levees. Shrink-swell potential is moderate.

This soil is mainly used for cultivated crops and pasture. Small acreages are used as homesites or woodland.

This soil is well suited to cultivated crops. Wetness is the main limitation. Soybeans is the main crop, but cotton, corn, small grains, and vegetables are also grown. This soil is somewhat difficult to keep in good tilth. It becomes cloddy if tilled when it is too wet or too dry. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Traffic pans develop easily but can be broken up by deep plowing or chiseling. Surface crusting and soil compaction can be reduced by returning crop residue to the soil and by minimum tillage. Most crops and pasture plants respond well to fertilizer. Lime generally is not needed.

This Commerce soil is well suited to pasture. The main limitation is wetness. Common bermudagrass, improved bermudagrass, Pensacola bahiagrass, tall fescue, ryegrass, and white clover are the main suitable pasture plants. Shallow ditches can remove excess surface water. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Nitrogen fertilizer is needed for optimum forage production.

This soil is well suited to use as woodland, but most areas have been cleared for use as cropland or pasture. The potential for the production of southern hardwoods is very high. Trees suitable for planting are eastern cottonwood and American sycamore.

This soil is moderately well suited to urban uses. It has moderate to severe limitations for building sites, local roads and streets, and most sanitary facilities. The main limitations are wetness, moderately slow permeability, and low strength as it applies to local roads and streets. Excess water can be removed by using shallow ditches and providing the proper grade. Designs for roads should offset the limitation of the soil to support a load. Unless internal drainage is improved, septic tank absorption fields do not function properly during rainy periods because of wetness and moderately slow permeability.

This Commerce soil is in capability subclass IIw and in woodland group 1w.

Co—Commerce silty clay loam, occasionally flooded. This is a level, somewhat poorly drained soil in high and intermediate positions on natural levees of the Mississippi River. It is subject to occasional flooding. The areas are long and narrow and range from 20 to more than 100 acres. Slope is less than 1 percent.

Typically, the surface layer is dark grayish brown, mildly alkaline silty clay loam about 8 inches thick. The subsoil is grayish brown, mildly alkaline silt loam. The underlying material to a depth of about 60 inches is grayish brown, mildly alkaline silt loam, silty clay loam, and very fine sandy loam. In places the subsoil is clay or silty clay between depths of 20 and 60 inches.

Included in mapping are a few small areas of Bruin, Newellton, and Sharkey soils. The moderately well drained Bruin soils are in slightly higher positions than Commerce soil and they contain less clay in the subsoil. The somewhat poorly drained Newellton soils and the poorly drained Sharkey soils are in lower positions, and they have a more clayey subsoil. Also included are small areas of Commerce silt loam, and Commerce soils that have slopes of 1 to 3 percent. The included soils make up about 10 percent of the map unit.

This soil has high fertility. Water and air move through this soil at a moderately slow rate. Water runs off the surface slowly. Adequate water is available to plants in most years. A seasonal high water table is about 1.5 to 4 feet below the surface from December through April. This soil is subject to flooding for brief to long periods ranging from a few days to a month late in winter, in spring, and early in summer. Flooding occurs about 2 times during each 15 year period during the crop growing season and more frequent during other times of the year. Shrink-swell potential is moderate.

This soil is mainly used for cultivated crops or pasture. In a few areas, it is used as woodland.

This soil is moderately well suited to cultivated crops. Wetness is the main limitation. Occasional flooding is a hazard. Soybeans is the main crop, but cotton, corn, small grains, and vegetables are also grown. This soil is somewhat difficult to keep in good tilth. It becomes cloddy if tilled when it is too wet or too dry. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Flooding delays planting or harvesting during some years, but it can be controlled by levees, channels, and pumps. Traffic pans develop easily but can be broken up by deep plowing or chiseling. Surface crusting and soil compaction can be reduced by returning crop residue to the soil and by minimum tillage. Most crops and pasture plants respond well to fertilizer. Lime generally is not needed.

This Commerce soil is moderately well suited to pasture. The main limitation is wetness. Occasional flooding is a hazard. Common bermudagrass, Pensacola bahiagrass, tall fescue, ryegrass, and white clover are the main suitable pasture plants. Shallow ditches can remove excess surface water. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Nitrogen fertilizer is needed for optimum forage production.

This soil is well suited to use as woodland. The potential for production of southern hardwoods is very high. The soil has few limitations for this use. Trees suitable for planting are eastern cottonwood and American sycamore.

This soil is poorly suited to most urban uses. It is not suitable for building sites. The main limitations are wetness and moderately slow permeability. Occasional flooding is a hazard. Excess water can be removed by using shallow ditches and providing the proper grade. Major flood control structures can control flooding. Because of wetness and moderately slow permeability, septic tank absorption fields do not function properly during rainy periods unless internal drainage is improved.

This Commerce soil is in capability subclass IIIw and in woodland group 1w.

CR—Commerce and Bruin soils, frequently flooded. The Commerce and Bruin soils are on natural levees of the Mississippi River. Commerce soil is somewhat poorly drained and Bruin soil is moderately well drained. These soils are in long, narrow areas between the river channels and protection levees. The Commerce soil is mainly in shallow swales, and the Bruin soil is on low, convex ridges. These soils are subject to flooding, scouring, and deposition. Slopes are generally short, but in places they are long and smooth. Slopes range from 0 to 3 percent.

Commerce soil makes up about 50 percent of the map unit, and Bruin soil makes up about 35 percent. These soils could have been mapped separately, but because frequent flooding limits their use and management, they were not separated in mapping. Some areas are mostly Commerce soil, some are mostly Bruin soil, and others are both soils in proportions that differ from one area to another.

Typically, Commerce soil has a dark grayish brown, slightly acid silty clay loam surface layer about 6 inches thick. In places, the surface layer is silt loam. The subsoil is dark grayish brown, mildly alkaline silt loam. The underlying material to a depth of about 60 inches is grayish brown, moderately alkaline silt loam.

Commerce soil has high fertility. Water and air move through this soil at a moderately slow rate. Water runs off the surface at a slow to medium rate. A seasonal high water table is about 1.5 to 4 feet below the surface during December to April. Adequate water is available to plants in most years. This soil is subject to flooding one or more times at any time of the year. Floodwater typically is 5 to 10 feet deep. Flooding duration is about 1 month. Shrink-swell potential is moderate.

Typically, Bruin soil has a dark brown, slightly acid very fine sandy loam surface layer about 8 inches thick. In places, the surface layer is silt loam or silty clay loam. The subsoil is brown, mildly alkaline silt loam and dark brown, moderately alkaline very fine sandy loam. The underlying material to a depth of about 60 inches is yellowish brown, moderately alkaline loamy fine sand.

Bruin soil has high fertility. Water and air move through this soil at a moderate rate. Water runs off the surface at a medium rate. Adequate water is available to plants in most years. This soil generally is subject to flooding for long periods one or more times each year. Floodwater typically is 5 to 10 feet deep. Shrink-swell potential is low.

Included in mapping are a few small areas of Crevasse, Newellton, Sharkey, and Tunica soils. The Crevasse soils are sandy throughout, and are in long, narrow bands adjacent to the Mississippi River. The Newellton, Sharkey, and Tunica soils are generally in lower positions, and are more clayey than Commerce and Bruin soils. Also included are small areas that have a fine sand surface layer. The included soils make up about 15 percent of the map unit.

The soils in this map unit are mainly used as woodland and wildlife habitat. Small acreages are used for cultivated crops or pasture. Many areas are used as a source of borrow material for levees and other construction purposes.

The soils in this map unit are moderately well suited to use as woodland. The potential for production of southern hardwoods is very high. The main concerns in producing and harvesting timber are frequent flooding, scouring, and deposition. Trees suitable for planting are eastern cottonwood and American sycamore (fig. 2).

The soils of this map unit are well suited to use as habitat for woodland wildlife and moderately well suited to use as habitat for wetland wildlife. Habitat for woodland wildlife can be improved by planting or propagating the natural growth of oak trees and suitable understory plants. Habitat for wetland wildlife can be improved by constructing shallow ponds to provide open water areas.

These soils are poorly suited to cultivated crops, mainly because of frequent flooding. Deposition or loss of soil by scouring can damage drainage systems.

These soils are poorly suited to pasture mainly because of frequent flooding by swiftly flowing water. Common bermudagrass is the main suitable pasture plant.

The soils of this map unit are not suited to homesites mainly because of wetness and the hazard of frequent flooding. It is not practical to control flooding.

These Commerce and Bruin soils are in capability subclass Vw. Commerce soil is in woodland group 1w, and Bruin soil is in woodland group 1o.

Cv—Crevasse fine sand, frequently flooded. This is a level to moderately sloping, excessively drained, sandy

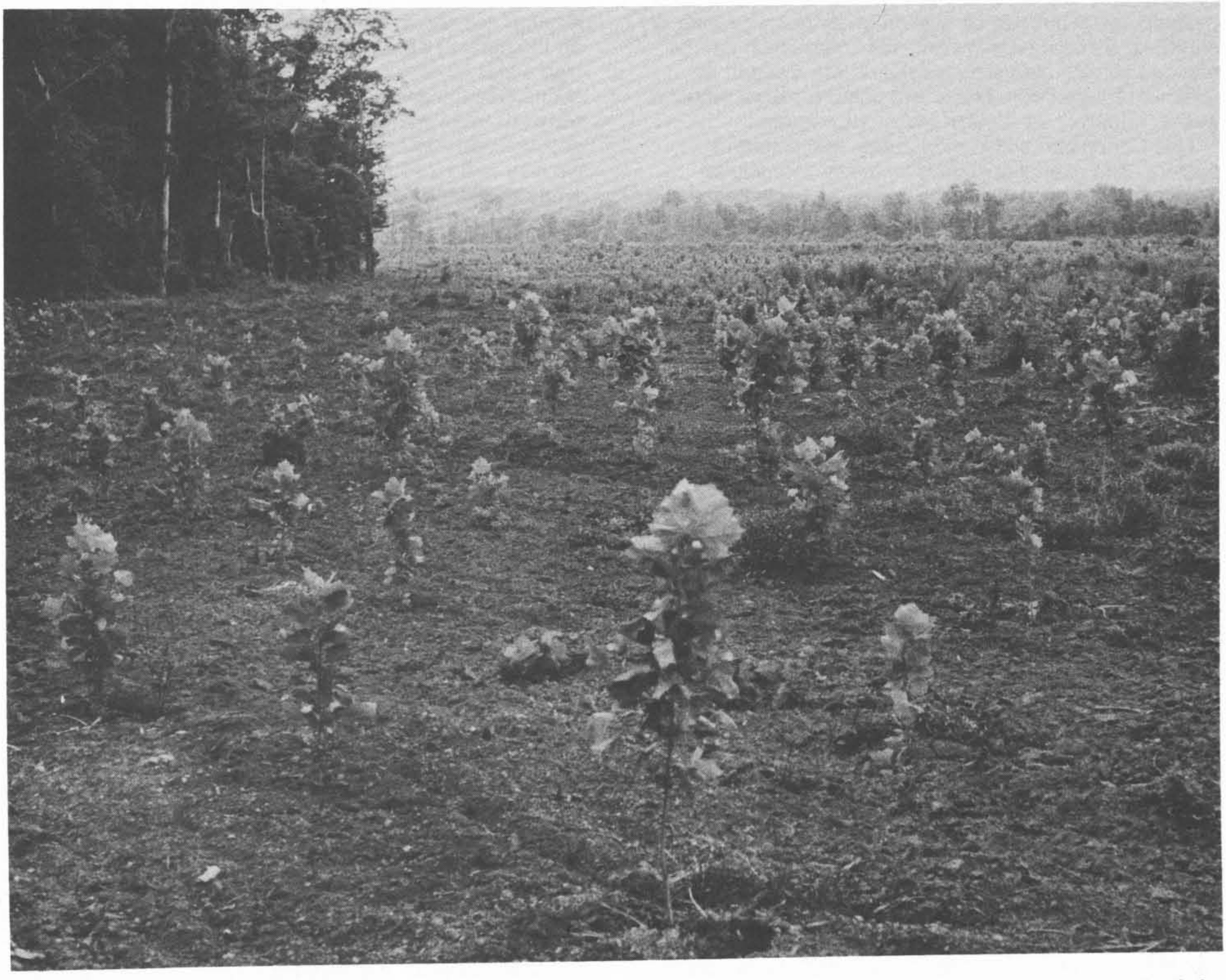


Figure 2.—Fast-growing American sycamore trees have been planted in some areas of Commerce and Bruin soils, frequently flooded.

soil on sandbars and high natural levees adjacent to the Mississippi River. It is subject to flooding, scouring, and deposition. The areas generally are long and narrow and range from 50 to 500 acres. Slopes generally are short, but in places they are long and smooth. Slopes range from 0 to 5 percent.

Typically, the surface layer is yellowish brown, neutral fine sand about 5 inches thick. In places, the surface layer is silt loam or very fine sandy loam. The underlying material to a depth of about 65 inches is brown and yellowish brown, neutral fine sand. In some lower elevations of the landscape, Crevasse soil contains thin strata of silt loam, silty clay loam, or silty clay within 40 inches of the surface.

Included in mapping are a few small areas of Bruin and Commerce soils. The Bruin and Commerce soils are in similar positions as Crevasse soil and they contain more clay in the subsoil and underlying layers. Also included are a few small areas of Crevasse soils that have slopes of 5 to 8 percent and soils that have a silt loam or very fine sandy loam surface layer. The included soils make up about 15 percent of the map unit.

This Crevasse soil has low fertility. Water and air move through it rapidly. Plants generally suffer from a lack of water during dry periods in summer and in fall of most years. A seasonal high water table is about 3.5 to 6 feet below the surface from November to March of most years. This soil is subject to brief periods of flooding during any time of the year, but more commonly late in winter, in spring, and early in summer of most years. Floodwater typically is 5 to 10 feet deep. Shrink-swell potential is low.

This soil is mainly used as woodland. Small acreages are used for cultivated crops or pasture.

This soil is poorly suited as habitat for woodland wildlife and very poorly suited as habitat for wetland wildlife. Habitat for woodland wildlife can be improved by propagating the natural growth of oak trees and suitable understory plants.

This Crevasse soil is poorly suited to use as woodland. The potential for production of timber is moderately high, but tree stands are difficult to establish because of droughtiness and deep, fast-flowing floodwater. Trees are often uprooted by floodwater or buried by sediment. Trees suitable for planting are eastern cottonwood and American sycamore.

This soil is poorly suited to cultivated crops mainly because of frequent flooding and droughtiness. Soybeans and grain sorghum are the main crops. Crop residue left on or near the surface helps conserve moisture, maintain tilth, and control erosion. Scouring and deposition during flood periods can damage drainage and irrigation structures. It is not practical to control flooding.

This soil is poorly suited to pasture mainly because of frequent flooding and droughtiness. Common bermudagrass is the main suitable pasture plant.

This soil is not suited to homesites. The main limitation is the hazard of frequent, fast-flowing floodwater. It is not practical to control flooding.

This Crevasse soil is in capability subclass Vw and in woodland group 2s.

Dd—Dundee loam. This is a level, somewhat poorly drained soil in high positions on natural levees along former channels of the Mississippi River and its distributaries. The areas are long and narrow and range from 10 to more than 300 acres. Slope is less than 1 percent.

Typically, the surface layer is brown, slightly acid loam about 7 inches thick. The subsoil is grayish brown, very strongly acid clay loam in the upper part and grayish brown, very strongly acid loam in the middle and lower part. The underlying material to a depth of about 65 inches is grayish brown, very strongly acid or strongly acid loam.

Included in mapping are a few small areas of Baldwin and Tensas soils. The Baldwin and Tensas soils are in slightly lower positions than Dundee soil, and they have a more clayey subsoil. Also included are a few small areas of Dundee soils that have slopes of 1 to 3 percent and soils that have a silt loam or very fine sandy loam surface layer. Included in places are a few small areas of soils that are similar to Dundee soil, except they contain less clay in the subsoil. The included soils make up about 10 percent of the map unit.

This Dundee soil has medium fertility. Water and air move through this soil at a moderately slow rate. Water runs off the surface slowly. Plants suffer from a lack of water during dry periods in summer and in fall of some years. A seasonal high water table is about 1.5 to 3.5 feet below the surface from January through April. Flooding from stream overflow is controlled in most places by manmade levees. Shrink-swell potential is moderate.

This soil is mainly used as pasture and for cultivated crops, mostly soybeans and cotton. In a few areas it is used as homesites.

This soil is well suited to cultivated crops, and has few limitations for this use. Soybeans, cotton, corn, small grains, and vegetables are the main suitable crops. This soil is friable, easy to keep in good tilth, and can be worked throughout a wide range of moisture content. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Traffic pans develop easily but can be broken up by deep plowing or chiseling. Surface crusting and soil compaction can be reduced by returning crop residue to the soil and by minimum tillage. Most crops and pasture plants respond well to fertilizer. Lime generally is needed.

This soil is well suited to pasture, and has few limitations for this use. Common bermudagrass, improved bermudagrass, Pensacola bahiagrass, tall fescue, ryegrass, and white clover are the main suitable pasture plants. Shallow ditches can remove excess surface water. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

This soil is well suited to use as woodland, but most areas have been cleared for use as cropland or pasture. The potential for production of southern hardwoods is high and this soil has few limitations for this use. Trees suitable for planting are eastern cottonwood, sweetgum, and water oak.

This soil is moderately well suited to urban uses. It has moderate to severe limitations for building sites, local roads and streets, and most sanitary facilities. The main limitations are wetness, moderately slow permeability, and low strength as it affects local roads and streets. Excess water can be removed by using shallow ditches and providing the proper grade. Because of wetness and moderately slow permeability, septic tank absorption fields do not function properly during rainy periods unless internal drainage is improved. Designs for roads should offset the limitation of the soil to support a load.

This Dundee soil is in capability subclass IIw and in woodland group 2w.

De—Dundee silty clay loam. This is a level, somewhat poorly drained soil in high and intermediate positions on natural levees along former channels of the Mississippi River and its distributaries. The areas are long and narrow and range from 10 to 150 acres. Slope is less than 1 percent.

Typically, the surface layer is dark grayish brown, strongly acid silty clay loam about 8 inches thick. The subsoil is dark grayish brown, medium acid silty clay loam in the upper part and grayish brown, medium acid loam in the lower part. The underlying material to a depth of about 60 inches is grayish brown, slightly acid loam and very fine sandy loam.

Included in mapping are a few small areas of Baldwin and Tensas soils. The Baldwin and Tensas soils are in slightly lower positions than Dundee soil, and they have a more clayey subsoil. Also included are a few small areas of Dundee soils that have slopes of 1 to 3 percent. The included soils make up about 10 percent of the map unit.

This Dundee soil has medium fertility. Water and air move through this soil at a moderately slow rate. Water runs off the surface slowly. Adequate water is available to plants in most years. A seasonal high water table is about 1.5 to 3.5 feet below the surface from January through April. Flooding from stream overflow is controlled in most places by manmade levees. Shrink-swell potential is moderate.

This soil is used mostly for cultivated crops, mainly soybeans and cotton, or as pasture. In a few areas it is used as homesites.

This soil is well suited to cultivated crops. Wetness is the main limitation. Soybeans, cotton, corn, small grains, and vegetables are the main suitable crops. This soil is somewhat difficult to keep in good tilth. It becomes cloddy if tilled when it is too wet or too dry. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Traffic pans develop easily but can be broken up by deep plowing or chiseling. Surface crusting and soil compaction can be reduced by returning crop residue to the soil and by minimum tillage. Most crops and pasture plants respond well to fertilizer. Lime generally is needed.

This Dundee soil is well suited to pasture. The main limitation is wetness. Common bermudagrass, improved bermudagrass, Pensacola bahiagrass, tall fescue, ryegrass, and white clover are the main suitable pasture plants. Shallow ditches can remove excess surface water. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

This soil is well suited to use as woodland, but most areas have been cleared for use as cropland or pasture. The potential for production of southern hardwoods is high and this soil has few limitations for this use. Trees suitable for planting are eastern cottonwood, sweetgum, and water oak.

This soil is moderately well suited to use as homesites. It has moderate to severe limitations for building sites, local roads and streets, and most sanitary facilities. The main limitations are wetness, moderately slow permeability, and low strength as it applies to local roads and streets. Excess water can be removed by using shallow ditches and providing the proper grade. Because of wetness and moderately slow permeability, septic tank absorption fields do not function properly during rainy periods unless internal drainage is improved. Designs for roads should offset the limitation of the soil to support a load.

This Dundee soil is in capability subclass IIw and in woodland group 2w.

Dh—Dundee-Alligator-Tensas complex, gently undulating. These are somewhat poorly drained and poorly drained soils on natural levees of old Mississippi River channels. The landscape consists of narrow, convex ridges and concave swales. The ridges are 1 foot to 3 feet high and about 100 to 300 feet wide. The swales are about 50 to 275 feet wide. The somewhat poorly drained Dundee soil is on ridges; the poorly drained Alligator soil is in the swales between ridges; and the somewhat poorly drained Tensas soil is on lower side slopes and in swales.

Areas of this map unit range from 50 to 500 acres and are about 45 percent Dundee soil, 25 percent Alligator soil, and 20 percent Tensas soil. The soils were so intricately intermingled that it was not practical to map them separately.

Typically, Dundee soil has a brown, strongly acid loam surface layer about 5 inches thick. In places, the surface layer is silty clay loam. The subsoil is dark grayish brown, very strongly acid silty clay loam in the upper part and grayish brown, very strongly acid loam in the lower part. The underlying material to a depth of about 60 inches is grayish brown, strongly acid very fine sandy loam.

The Dundee soil has medium fertility. Water and air move through this soil at a moderate rate. Runoff is medium, and the hazard of water erosion is moderate. A seasonal high water table is about 1.5 to 3.5 feet below the surface from January through April. Plants are damaged by lack of water during dry periods in summer and fall of some years.

Typically, the Alligator soil has a dark grayish brown, very strongly acid silty clay loam surface layer about 6 inches thick. In some places, the surface layer is silt loam or clay. The subsoil is dark gray, very strongly acid clay in the upper part and gray, strongly acid clay in the lower part. The underlying material to a depth of about 60 inches is dark gray, slightly acid clay.

The Alligator soil has medium fertility. Water and air move through this soil very slowly. Water runs off the surface very slowly and ponds in low places for long periods after heavy rains. A seasonal high water table is about 1.5 to 2 feet below the surface from January through April of most years. Adequate water is available to plants in most years. This soil is subject to rare flooding by runoff from higher elevations during prolonged, high-intensity rainstorms. This can occur any time during the year. This soil has very high shrink-swell potential.

Typically, the Tensas soil has a very dark grayish brown, medium acid silty clay surface layer about 5 inches thick. The subsoil is dark gray, very strongly acid clay in the upper part and gray, very strongly acid silty clay in the lower part. The underlying material to a depth of about 60 inches is dark grayish brown, strongly acid silty clay loam and silt loam.

The Tensas soil has medium fertility. Water and air move through the upper part of this soil very slowly and through the lower part at a moderately slow rate. Water runs off the surface at a medium rate. Plants are damaged by lack of water during dry periods in summer and fall of some years. A seasonal high water table is about 1 foot to 3 feet below the surface from December through April. This soil is subject to rare flooding by runoff from higher elevations during prolonged, high-intensity rainstorms. This can occur any time during the year. This soil has very high shrink-swell potential.

Included in mapping are a few small areas of Fausse and Sharkey soils and unnamed sandy soils. The very poorly drained Fausse soils are in the lowest parts of some swales and remain wet throughout most years. The Sharkey soils are in some swales and are more clayey than Dundee soil and less acid than Alligator and Tensas soils. The sandy soils are on the highest elevations of some ridges. Also included are a few small areas of Dundee soils that have slopes of 1 to 3 percent and areas where the subsoil is medium acid to mildly alkaline between depths of 30 and 40 inches. Also included are a few small areas of Tensas soils that have a silt loam or silty clay loam surface layer. The included soils make up about 10 percent of the map unit.

The soils in this map unit are mainly used for cultivated crops. Small acreages are used as woodland, pasture, or homesites.

This complex is moderately well suited to cultivated crops. Wetness, the clayey surface layer, and short, choppy slopes are the main limitations. Soybeans is the main crop, but cotton, corn, grain sorghum, wheat, oats, and vegetables are also grown. Alligator and Tensas soils, in swales and lower side slopes, are difficult to keep in good tilth. Dundee soil, on ridges, is friable and easy to keep in good tilth. Traffic pans develop easily in Dundee soil, but can be broken up by deep plowing or chiseling. Alligator and Tensas soils are sticky when wet and hard when dry, and they become cloddy if tilled when they are too wet or too dry. A drainage system is needed for most cultivated crops and pasture plants. Land grading and smoothing improve surface drainage, but in places, large volumes of soil need to be moved. Crop residue left on or near the surface helps to conserve moisture, maintain tilth, and control erosion. Crops respond well to lime and fertilizer.

The soils of this map unit are well suited to eastern cottonwood, sweetgum, American sycamore, and water oak. Wetness in the swales is the main concern in producing and harvesting timber. Equipment use is limited unless drainage is provided.

The soils of this complex are well suited to pasture. Wetness in the swales is the main limitation. Common bermudagrass, improved bermudagrass, Pensacola bahiagrass, tall fescue, ryegrass, white clover, and small grains are the main suitable pasture plants. Shallow ditches can remove excess surface water. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

This complex is somewhat poorly suited to urban uses. If buildings are constructed, Dundee soil is the more suitable for this use. Wetness and shrink-swell potential are moderate limitations. If Alligator or Tensas soils are used as homesites, the main limitations are wetness, very slow permeability, and very high shrink-swell potential. Flooding is a hazard. Drainage and fill material are needed to make these soils suitable for most urban uses. The effects of shrinking and swelling can be minimized by proper design and by backfilling with material that has low shrink-swell potential.

This complex is in capability subclass IIIw and in woodland group 2w.

Ds—Dundee-Alligator-Tensas complex, undulating. These are somewhat poorly drained and poorly drained soils on natural levees of old Mississippi River channels. The landscape consists of narrow, convex ridges and concave swales. The ridges are 3 to 8 feet high and about 75 to 200 feet wide. The swales are about 35 to 150 feet wide. The somewhat poorly drained Dundee soil is on ridges; the poorly drained Alligator soil is in swales; and the somewhat poorly drained Tensas soil is on lower side slopes and in swales. Slopes are short and choppy and range from 0 to 5 percent.

Areas of this complex range from 50 to 500 acres and are about 40 percent Dundee soil, 25 percent Alligator soil, and 20 percent Tensas soil. The soils were so intricately intermingled that it was not practical to map them separately.

Typically, Dundee soil has a dark grayish brown, very strongly acid loam surface layer about 7 inches thick. In places the surface layer is silty clay loam. The subsoil is dark grayish brown, very strongly acid silty clay loam in the upper part and dark grayish brown, medium acid loam in the lower part. The underlying material to a depth of about 60 inches is grayish brown, medium acid loam.

The Dundee soil has medium fertility. Water and air move through this soil at a moderate rate. Runoff is medium, and the hazard of erosion is moderate. A seasonal high water table is about 1.5 to 3.5 feet below the surface from January through April. Plants are damaged by lack of water during dry periods in summer and fall of some years.

Typically, the Alligator soil has a dark gray, very strongly acid clay surface layer about 4 inches thick. The subsoil is gray, very strongly acid clay in the upper part and dark gray, strongly acid clay in the lower part. In places, the subsoil is medium acid to mildly alkaline between depths of 30 and 40 inches. The underlying material to a depth of about 60 inches is gray and dark gray, slightly acid clay and silty clay.

The Alligator soil has medium fertility. Water and air move through this soil very slowly. Water runs off the surface very slowly and ponds in low places for long periods after heavy rains. A seasonal high water table is about 0.5 foot to 2 feet below the surface from January through April of most years. Adequate water is available to plants in most years. This soil is subject to rare flooding by runoff from higher elevations during prolonged, high intensity storms. This can occur any time during the year. This soil has very high shrink-swell potential.

Typically, the Tensas soil has a brown, strongly acid silty clay surface layer about 4 inches thick. The subsoil is dark grayish brown, very strongly acid clay in the upper part and grayish brown, very strongly acid clay in the lower part. The underlying material to a depth of about 60 inches is dark grayish brown, strongly acid, very fine sandy loam.

The Tensas soil has medium fertility. Water and air move through the upper part of this soil very slowly and through the lower part at a moderately slow rate. Water runs off the surface at a medium rate. Plants are damaged by lack of water during dry periods in summer and fall of some years. A seasonal high water table is about 1 foot to 3 feet below the surface from December through April. Flooding is rare, but it can occur during periods of intense, prolonged rainstorms at any time during the year. This soil has very high shrink-swell potential.

Included in mapping are a few small areas of Fausse and Sharkey soils and unnamed sandy soils. Also included are a few small areas of Dundee soils that have slopes of 5 to 8 percent. The very poorly drained Fausse soils are in the lowest parts of some swales and remain wet throughout most years. The Sharkey soils are in swales and are more clayey than Dundee soil and less acid than Alligator and Tensas soils. The sandy soils are on the highest elevations of some ridges. Also included are a few small areas of Alligator and Tensas soils that have a silt loam or silty clay loam surface layer. The included soils make up about 15 percent of the map unit.

The soils of this complex are mainly used for cultivated crops. A few areas are used as woodland, pasture, or homesites.

This complex is somewhat poorly suited to cultivated crops. Wetness, the clayey surface texture, and short, choppy slopes are the main limitations. Soybeans is the main crop, but cotton, corn, grain sorghum, wheat, oats, and vegetables are also grown. Alligator and Tensas soils, in swales and lower slopes, are difficult to keep in good tilth. Dundee soil is friable and easy to keep in good tilth. Traffic pans develop easily in Dundee soil, but these can be broken up by deep plowing or chiseling. Alligator and Tensas soils are sticky when wet and hard when dry, and they become cloddy if tilled when they are too wet or too dry. A drainage system is needed for most cultivated crops and pasture plants. Land grading and smoothing improve surface drainage, but in places, large volumes of soil need to be moved. Crop residue left on or near the surface helps to conserve moisture, maintain tilth, and control erosion. Crops respond well to lime and fertilizer.

The soils of this unit are well suited to eastern cottonwood, sweetgum, American sycamore, and water oak. Wetness in the swales is the main concern in producing and harvesting timber. Equipment use is limited unless drainage is provided.

Soils of this map unit are moderately well suited to pasture. Wetness is the main limitation. Common bermudagrass, improved bermudagrass, Pensacola bahiagrass, tall fescue, ryegrass, white clover, and small grains are the main suitable pasture plants. Shallow ditches can remove excess surface water. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

These soils are somewhat poorly suited to homesites. If buildings are constructed, Dundee soil is the more suitable soil for this use. Wetness and shrink-swell potential are moderate limitations. If Alligator or Tensas soils are used as homesites, the main limitations are wetness, very slow permeability, and very high shrink-swell potential. Flooding is a hazard. Drainage and fill material are needed to make these soils suitable for most urban uses. The effects of shrinking and swelling can be minimized by proper design and by backfilling with material that has low shrink-swell potential.

This complex is in capability subclass IIIw and woodland group 2w.

Fa—Fausse clay. This is a level, very poorly drained soil in depressional areas on the alluvial plain. This soil is subject to ponding and frequent flooding (fig. 3). The areas range from about 5 to 250 acres. Slope is less than 1 percent.

Typically, the surface layer is very dark grayish brown mucky clay underlain by a dark gray, neutral clay about 12 inches thick. The subsoil is gray, slightly acid clay. The underlying material is gray, neutral clay to a depth of about 62 inches.

Included in mapping are a few small areas of Sharkey and Tunica soils. The poorly drained Sharkey and Tunica soils are in slightly higher positions than Fausse soil, and in most years during dry periods, they develop cracks to a depth of about 20 inches. Also included are small areas where the surface layer is dark reddish brown clay.

This Fausse soil has high fertility. Water and air move through this soil very slowly. Adequate water is available to plants in most years. This soil is subject to brief to very long periods of ponding and flooding during any season of the year, but generally continuously from late in fall to early in summer. Depth of floodwater is typically 1 foot to 5 feet, but it may exceed 15 feet in places. This soil has a seasonal high water table that fluctuates between a depth of 1.5 feet and 1 foot above the surface when water ponds. This soil has very high shrink-swell potential, but it seldom dries enough to crack.

This soil is mainly used for wildlife habitat. A small acreage is used for timber production.

This soil has good potential for habitat for resident and migratory waterfowl, many species of songbirds and wading birds, raccoons, nutria, muskrat, and crawfish. Low-level weirs for water control, level ditches, controlled burning, and controlled tree harvest can improve the habitat for wildlife.

This soil is poorly suited to southern hardwoods. Wetness and long periods of flooding are the main concerns in producing and harvesting timber. Wetness severely limits the use of equipment. Only trees that can tolerate seasonal wetness, such as baldcypress, should be planted (fig. 4).

This Fausse soil is not suited to cultivated crops, pasture, or urban uses. Wetness from ponding and flooding severely restricts these uses. Flood control structures and extensive local drainage improvements are needed to protect this soil from ponding and flooding.

This Fausse soil is in capability subclass VIIw and in woodland group 4w.

La—Latanier clay, gently undulating, occasionally flooded. This is a somewhat poorly drained soil in intermediate positions on the natural levee of the Red River. This soil is subject to occasional flooding. The landscape consists of concave swales, narrow ridges, and broad knolls. The areas are long and narrow and range from 10 to 250 acres. Slopes range from 0 to 3 percent.

Typically, the surface layer is dark reddish brown, mildly alkaline clay about 5 inches thick. The subsoil is dark reddish brown, mildly alkaline clay and silty clay. The underlying material to a depth of about 72 inches is brown and strong brown, mildly alkaline silty clay loam, very fine sandy loam, and silt loam.

Included in mapping are a few small areas of Norwood soils and Sharkey, overwash soils. The well drained Norwood soils are in slightly higher positions than Latanier soil, and they are loamy throughout. The poorly drained Sharkey, overwash soils are in swales and low positions on the natural levees and are clayey throughout. Also included are a few small areas of Latanier soils that have a silt loam or silty clay loam surface layer. The included soils make up about 10 percent of the map unit.

This soil has high fertility. Water and air move through this soil very slowly. Water runs off the surface slowly and stands in low places for long periods after heavy rains. A seasonal high water table is 1 foot to 3 feet below the surface from December through April. Adequate water is available to plants in most years. This soil is subject to flooding for brief periods late in winter, in spring, and early in summer. Flooding occurs about 3 times during each 15 year period during the crop growing season and more often at other times of the year. Floodwater typically is 2 to 5 feet deep, but the depth exceeds 8 feet in places. The surface layer is very sticky when wet and very hard when dry. This soil has very high shrink-swell potential.

This soil is mainly used as woodland and as habitat for wildlife. Small acreages are used for cultivated crops, pasture, or timber production.

This soil has good potential for habitat for white-tailed deer, squirrels, swamp rabbits, turkey, bobcats, and many species of nongame birds and animals. Habitat for

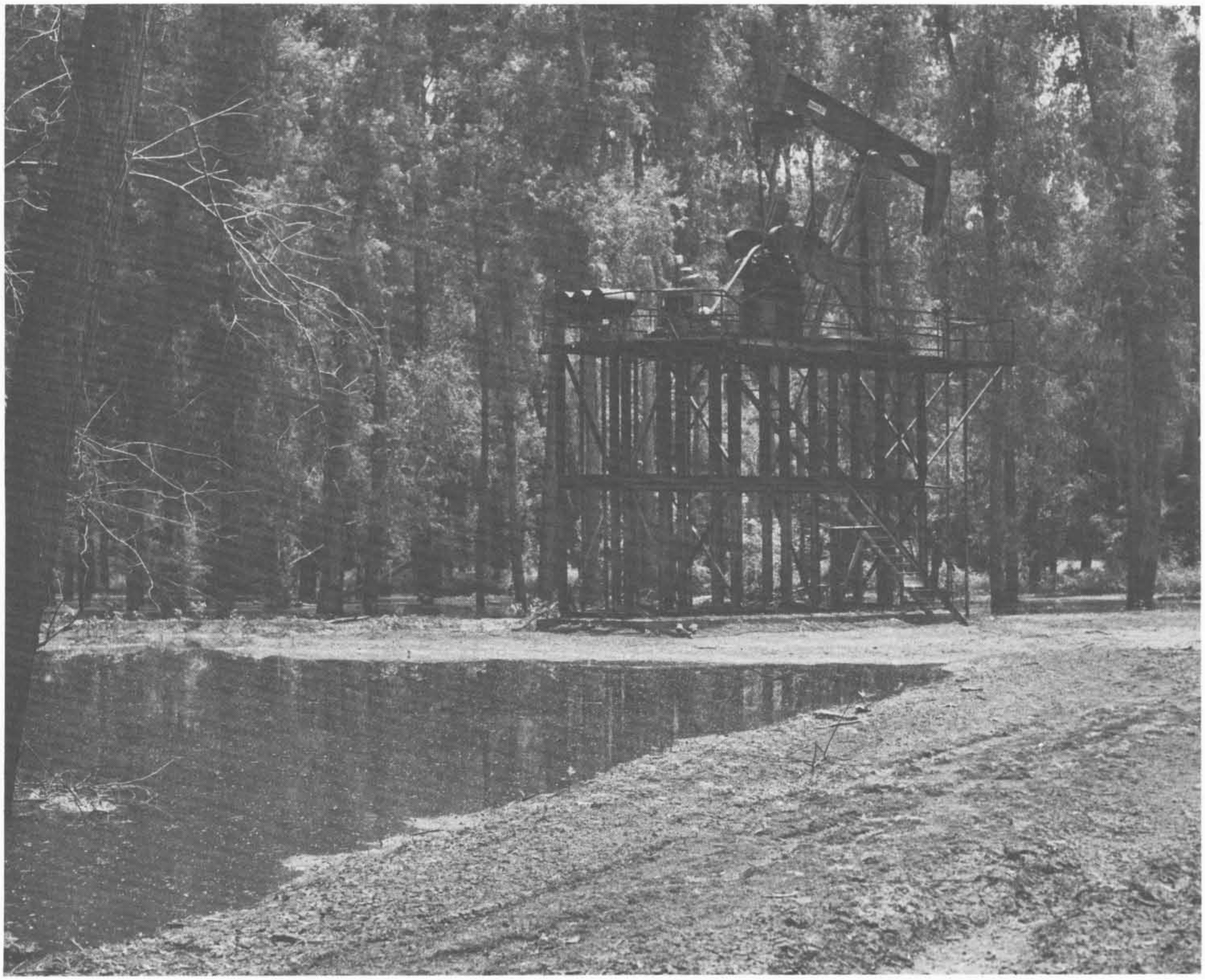


Figure 3.—This oil well pump is on an elevated platform because of frequent flooding that is a severe limitation for most uses in this area of Fausse clay.

wildlife can be improved by providing small clearings and planting appropriate vegetation for food.

This Latanier soil is well suited to southern hardwoods. The main concerns in producing and harvesting timber are occasional flooding and wetness. The use of equipment is limited unless drainage is provided. Conventional methods of harvesting can be used except sometimes during rainy periods, generally from December to June. Only trees that can tolerate seasonal wetness, such as eastern cottonwood and American sycamore, should be planted.

This soil is somewhat poorly suited to cultivated crops. Wetness, choppy slopes, and poor tilth are the main limitations. Flooding is a hazard. Short-season crops can be grown in most years; however, flooding can delay planting dates. This soil is difficult to keep in good tilth. It can be worked only within a narrow range of moisture content. It becomes cloddy if tilled when it is too wet or too dry. Irregular slopes hinder tillage operations. Land grading and smoothing improve surface drainage, but in places, large volumes of soil need to be moved. Flooding can be controlled by levees, channels, and

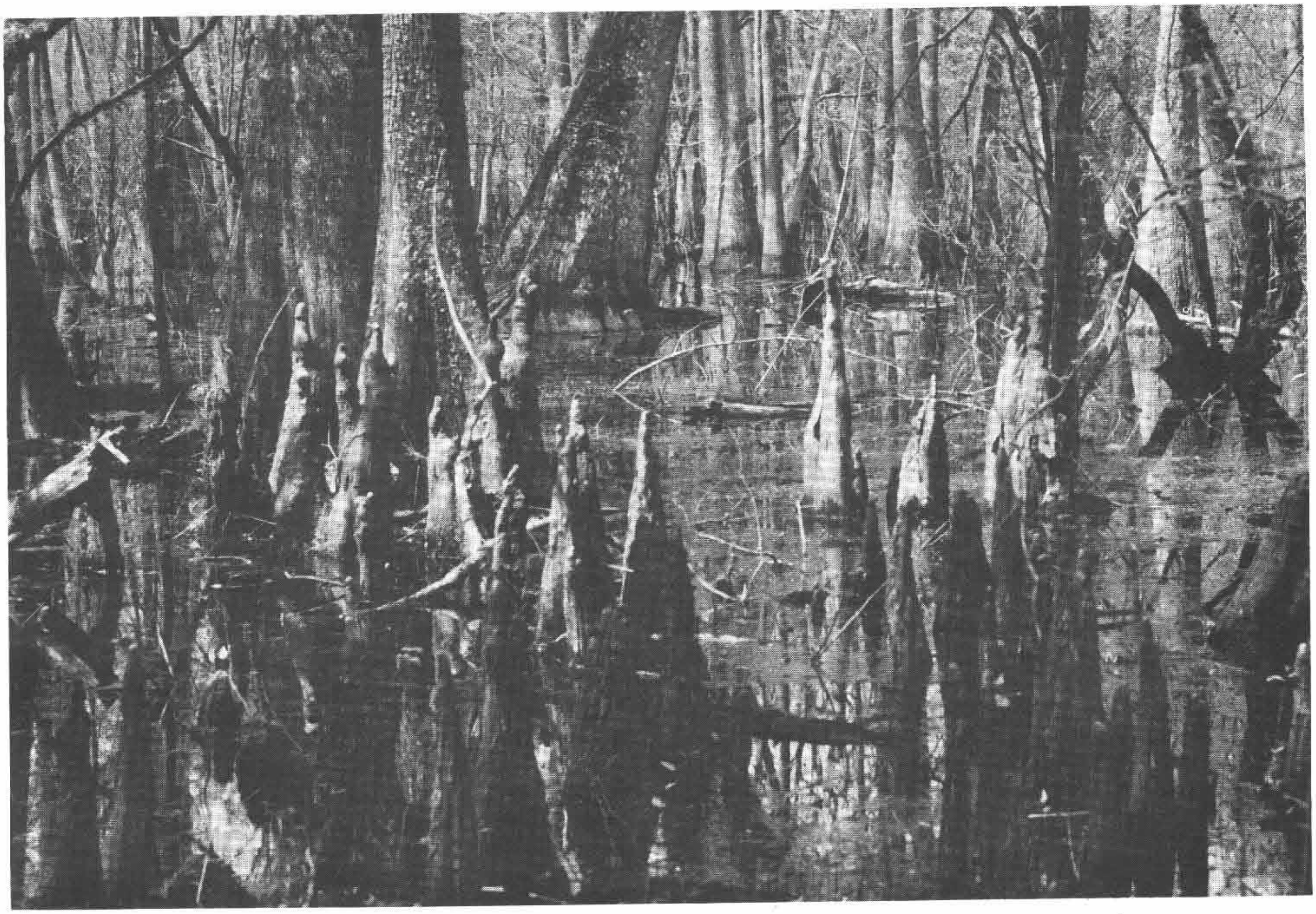


Figure 4.—Baldcypress and swamp tupelo are the main trees in this area of Fausse clay. This soil is poorly suited to the production of commercial timber.

pumps. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water.

This soil is somewhat poorly suited to pasture. Wetness is the main limitation. Flooding is a hazard. Common bermudagrass is the main suitable pasture plant. Shallow ditches can remove excess surface water. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Nitrogen fertilizer is needed for optimum forage production. Lime generally is not needed.

This map unit is poorly suited to most urban uses. It is not suitable for building sites. The main limitations are wetness, very slow permeability, and very high shrink-swell potential. Flooding is a hazard. Major flood control structures and extensive local drainage systems are needed to protect this soil from flooding. The effects of shrinking and swelling can be minimized by proper design and by backfilling with material that has low shrink-swell potential.

This Latanier soil is in capability subclass IVw and in woodland group 2w.

Ne—Newellton clay. This is a level, somewhat poorly drained soil in intermediate positions on natural levees of the Mississippi River. The areas are generally long and narrow and range from 5 to 250 acres. Slope is less than 1 percent.

Typically, the surface layer is dark gray, slightly acid clay about 5 inches thick. The subsoil is dark grayish brown, neutral clay. The underlying material to a depth of about 60 inches is dark grayish brown and grayish brown, moderately alkaline to neutral silty clay loam, silt loam, and very fine sandy loam.

Included in mapping are a few small areas of the Bruin, Commerce, Sharkey, and Tunica soils. The Bruin and Commerce soils are on slightly higher positions than Newellton soil, and they are loamy throughout. The Sharkey and Tunica soils are in slightly lower positions, and they have a thicker, clayey subsoil. Also included are a few small areas of Newellton soils that have a silt loam or silty clay loam surface layer. The included soils make up about 10 percent of the map unit.

This Newellton soil has high fertility. Water and air move through the upper part of this soil slowly and through the lower part at a moderately slow rate. Water runs off the surface slowly. A seasonal high water table is about 1 foot to 3 feet below the surface from December through April. Adequate water is available to plants in most years. Flooding is rare, but it can occur during intense prolonged rainstorms at any time during the year. The surface layer of this soil is sticky when wet and very hard when dry. This soil has a high shrink-swell potential.

This soil is mostly used for cultivated crops, mainly soybeans, or for pasture. Small acreages are used as woodland or homesites.

This soil is well suited to cultivated crops. Poor tilth and wetness are the main limitations. Soybeans, cotton, corn, small grains, and vegetables are the main suitable crops. This soil is difficult to keep in good tilth. It can be worked only within a narrow range of moisture content. It becomes cloddy if tilled when it is too wet or too dry. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Crop residue left on or near the surface reduces runoff and helps to maintain soil tilth and the content of organic matter. Most crops and pasture plants respond well to fertilizer. Lime generally is not needed.

This soil is well suited to pasture. The main limitations are wetness and slow permeability. Common bermudagrass, improved bermudagrass, dallisgrass, tall fescue, ryegrass, and white clover are the main suitable pasture plants. Shallow ditches can remove excess surface water. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Nitrogen fertilizer is needed for optimum forage production.

This map unit is well suited to southern hardwoods. Wetness is the main concern in producing and harvesting timber. The use of equipment is limited unless drainage is provided. Conventional methods of harvesting can be used except sometimes during rainy periods, generally from December to April. Trees suitable for planting are eastern cottonwood and American sycamore.

This soil is poorly suited to urban uses. It has severe limitations for building sites, local roads and streets, and most sanitary facilities. The main limitations are wetness, slow permeability, and high shrink-swell potential. Flooding is a hazard. Excess water can be removed by using shallow ditches and providing the proper grade. Slow permeability and the high water table increase the possibility that septic tank absorption fields will fail. Structural damage to buildings as a result of shrinking and swelling can be prevented by properly designing foundations and footings, and by diverting runoff away from the buildings.

This Newellton soil is in capability subclass IIw and in woodland group 2w.

NS—Newellton and Sharkey soils, frequently flooded. These are nearly level to undulating soils in low positions on natural levees along the Mississippi River between the river channel and the protective levee. The Newellton soil is somewhat poorly drained and the Sharkey soil is poorly drained. The Newellton soil is on narrow to broad ridges and the Sharkey soil is in swales and broad flats. These soils are subject to flooding, scouring, and deposition. The areas are typically long and narrow, but in places they are broad. Slopes generally are short. They range from 0 to 5 percent.

Newellton soil makes up about 50 percent of the map unit, and Sharkey soil makes up about 30 percent. These soils could have been mapped separately, but because frequent flooding limits their use and management, they were not separated in mapping. Some areas are mostly Newellton soil, some are mostly Sharkey soil, and others are both soils in proportions that differ from one area to another.

Typically, Newellton soil has a dark grayish brown, neutral clay surface layer about 4 inches thick. The subsoil is dark grayish brown, mildly alkaline clay. The underlying material to a depth of about 60 inches is dark grayish brown, moderately alkaline silt loam and dark gray silty clay loam.

Newellton soil has high fertility. Water runs off the surface at a slow to medium rate. Water and air move through the upper part of this soil slowly and through the lower part at a moderately slow rate. A seasonal high water table is about 1 foot to 3 feet below the surface from December through April. Adequate water is available to plants in most years. The Newellton soil is subject to flooding for brief to long periods one or more times each year. This can occur any time during the year. This soil is subject to scouring and deposition by fast-flowing floodwater. Floodwater typically is 5 to 10 feet deep. This soil has high shrink-swell potential.

Typically, the Sharkey soil has a surface layer of dark gray, slightly acid clay about 9 inches thick. The subsoil is dark gray, neutral or mildly alkaline clay and silty clay. The underlying material to a depth of about 60 inches is gray, mildly alkaline clay.

Sharkey soil has high fertility. Water and air move through this soil very slowly. Water runs off the surface slowly. A seasonal high water table fluctuates between a depth of about 2 feet and the soil surface from December through April. Adequate water is available to plants in most years. This Sharkey soil is generally subject to flooding for brief to very long periods one or more times each year. This can occur any time during the year. It is subject to scouring and deposition. Floodwater typically is 5 to 15 feet deep, but the depth exceeds 20 feet in places. Flood duration may exceed 3 months and generally occurs from December through June. This soil has a very high shrink-swell potential.

Included in mapping are a few small areas of Commerce, Fausse, and Tunica soils. The Commerce soils are generally in higher positions than Newellton and Sharkey soils, and they are loamy throughout. The Fausse soils are in some deeper swales and they remain wet most of the year. The Tunica soils are in intermediate positions between the Newellton and Sharkey soils, and they are clayey to a depth of 20 to 36 inches. Also included are a few small areas of Newellton soils that have a silt loam, very fine sandy loam, or silty clay loam surface layer and areas of Sharkey soils that have a silt loam, silty clay loam, or fine sand surface layer. The included soils make up about 20 percent of the map unit.

This map unit is mainly used as woodland and for wildlife habitat. Small acreages are used for cultivated crops or pasture. A few small areas are used as a source of borrow material for levees and other construction purposes.

These soils are moderately well suited to southern hardwoods. The main concerns in producing and harvesting timber are wetness, flooding, scouring, and deposition. Conventional methods of harvesting generally can be used except sometimes during periods of wetness or flooding, generally from December to June. Trees suitable for planting are eastern cottonwood, baldcypress, and American sycamore.

These soils are moderately well suited to use as habitat for woodland and wetland wildlife and poorly suited to use as habitat for openland wildlife. Habitat for wildlife can be improved by planting appropriate vegetation, by maintaining existing plant cover, or by propagating the natural growth of desirable plants.

These Newellton and Sharkey soils are poorly suited to most cultivated crops. Wetness is the main limitation. Frequent flooding is a hazard. Deposition or loss of soil material by scouring during floods may damage drainage systems.

These soils are poorly suited to pasture. The main limitation is the hazard of frequent flooding by swiftly flowing water. Common bermudagrass is the main suitable pasture plant.

The soils of this map unit are not suited to homesites, mainly because of frequent flooding. It is not practical to control flooding.

This map unit is in capability subclass Vw and woodland group 3w.

Nw—Norwood silt loam, gently undulating, occasionally flooded. This is a well drained soil in high positions on natural levees of the Red River. This soil is subject to occasional flooding. The areas are long and narrow and range from 10 to 300 acres. Slopes are short and choppy and range from 0 to 3 percent.

Typically, the surface layer is reddish brown, mildly alkaline silt loam about 5 inches thick. The subsoil is reddish brown, mildly alkaline silt loam. The underlying material to a depth of about 86 inches is yellowish red and reddish brown, mildly alkaline or moderately alkaline silt loam and very fine sandy loam. In some of the higher elevations of the landscape, the Norwood soil has less clay in the subsoil than is typical for this soil.

Included in mapping are a few small areas of Latanier soils. The Latanier soils are in lower positions than Norwood soil and they have dark color clayey surface and subsoil layers. Also included are a few small areas of Norwood soils that rarely flood and soils that have a silty clay loam surface layer. The included soils make up about 10 percent of the map unit.

This Norwood soil has high fertility. Water and air move through this soil at a moderate rate. Water runs off the surface slowly. Adequate water is available to plants in most years. This soil is subject to very brief periods of flooding late in winter, in spring, and early in summer. Flooding occurs about 2 times during each 15 year period during the crop growing season and more often at other times of the year. This soil has low shrink-swell potential.

This soil is mainly used as woodland and for wildlife habitat. Small acreages are used for cultivated crops or homesites.

This soil is well suited to woodland. The potential for production of southern hardwoods is very high, and the soil has few limitations for this use. Trees suitable for planting are eastern cottonwood and American sycamore.

This Norwood soil is moderately well suited to cultivated crops, although occasional flooding is a hazard. Soybeans is the main crop; but cotton, corn, small grains, and vegetables are also grown. This soil is friable, easy to keep in good tilth, and can be worked throughout a wide range of moisture content. Flooding can delay planting or harvesting in some years, but it can be controlled by levees, channels, and pumps. Land grading and smoothing improve surface drainage, but in places, large volumes of soil need to be moved. Traffic pans develop easily but can be broken up by deep plowing or chiseling. Surface crusting and soil compaction can be reduced by returning crop residue to the soil and by minimum tillage.

This unit is moderately well suited to pasture, although occasional flooding is a hazard. Common bermudagrass is the main suitable pasture plant; improved bermudagrass, tall fescue, ryegrass, and white clover can be grown with good management. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Nitrogen fertilizer is needed for optimum forage production.

This soil is poorly suited to most urban uses. It is not suited to use as building sites, mainly because of flooding. Major flood control structures and extensive local drainage systems are needed to protect this soil from flooding.

This Norwood soil is in capability subclass IIw and woodland group 1o.

Sa—Sharkey silt loam. This is a level, poorly drained soil in low positions on natural levees of the Mississippi River. The areas are long and narrow and range from 25 to 150 acres. Slope is less than 1 percent.

Typically, the surface layer is dark grayish brown, mildly alkaline silt loam about 8 inches thick. The subsoil and underlying material to a depth of about 60 inches is dark gray, mildly alkaline clay.

Included in mapping are a few small areas of Commerce, Newellton, and Tunica soils. The Commerce soils are in slightly higher positions than Sharkey soil, and they are loamy throughout. The Newellton and Tunica soils are in slightly higher positions, and have loamy underlying materials. Also included in places are a few small areas of Sharkey soils that have a silty clay loam surface layer. The included soils make up about 5 percent of the map unit.

This Sharkey soil has high fertility. Water and air move through this soil very slowly. Water runs off the surface slowly and stands in low places for long periods after heavy rains. A seasonal high water table fluctuates between a depth of about 2 feet and the soil surface from December through April. Adequate water is available to plants in most years. Flooding from stream overflow is controlled in most places by levees, but some areas are subject to rare flooding from runoff. This can occur any time during the year. This soil has very high shrink-swell potential.

This soil is mainly used for cultivated crops and pasture. In a few areas, it is used as woodland or homesites.

This soil is moderately well suited to cultivated crops. Wetness and very slow permeability are the main limitations. Soybeans is the main crop; but rice and grain sorghum are also grown. The surface layer is friable, but tilth is somewhat difficult to maintain when cultivation has mixed the clayey subsoil into the plow layer. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Pipe or other drop structures installed in drainage ditches control the water level in ricefields and prevent excessive erosion of ditches. Crop residue left on or near the surface helps to conserve moisture, maintain tilth, and control erosion.

This map unit is moderately well suited to pasture. Wetness and very slow permeability are the main limitations. Common bermudagrass, improved bermudagrass, dallisgrass, tall fescue, small grains, ryegrass, and white clover are the main suitable pasture plants. Shallow ditches can remove excess surface water. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Nitrogen fertilizer is needed for optimum forage production. Lime generally is not needed.

This Sharkey soil is well suited to southern hardwoods, and it has high production potential. Wetness is the main concern in producing and harvesting timber. Equipment use is limited unless drainage is provided. Conventional methods of harvesting can be used except sometimes during rainy periods, generally from December to June. Trees suitable for planting are eastern cottonwood, American sycamore, and sweetgum.

This soil is poorly suited to homesites. It has severe limitations for building sites, local roads and streets, and most sanitary facilities. The main limitations are wetness, very slow permeability, very high shrink-swell potential, and low strength as it affects local roads and streets. Excess water can be removed by using shallow ditches and providing the proper grade. The effects of shrinking and swelling can be minimized by proper design and by backfilling with material that has low shrink-swell potential. Septic tank absorption fields do not function properly during rainy periods because of wetness and very slow permeability. Sewage lagoons are needed if this soil is used as homesites.

This Sharkey soil is in capability subclass IIIw and in woodland group 2w.

Sh—Sharkey clay. This is a level, poorly drained, clayey soil on broad, flat areas of the alluvial plain. The areas range from about 25 to more than 4,500 acres. Slope is less than 1 percent.

Typically, the surface layer is dark grayish brown, medium acid clay about 11 inches thick. The subsoil is dark gray, slightly acid to mildly alkaline clay. In places the upper part of the subsoil is strongly acid. The underlying material to a depth of about 75 inches is gray and olive gray, neutral or mildly alkaline clay.

Included in mapping are a few small areas of Alligator, Commerce, Fausse, and Tunica soils. The Alligator soils are in slightly higher positions than Sharkey soil and are more acid in the subsoil. The somewhat poorly drained Commerce soils are in higher positions and are loamy throughout. The very poorly drained Fausse soils are in depressional areas and remain wet most of the year. The Tunica soils are in slightly higher positions and have loamy underlying materials. Also included are a few small areas of Sharkey soils that have slopes of 1 to 3 percent, and small areas where the upper part of the subsoil is strongly acid. The included soils make up about 10 percent of the map unit.

This Sharkey soil has high fertility. Water and air move through this soil very slowly. Water runs off the surface slowly and stands in low places for long periods after heavy rains. Flooding is rare, but it can occur during periods of unusually prolonged, high intensity rainfall at any time during the year. A seasonal high water table fluctuates between a depth of 2 feet and the soil surface from December through April. Adequate water is available to plants in most years. The surface layer of this soil remains wet for long periods after heavy rains. This soil has very high shrink-swell potential.

This soil is mostly used for cultivated crops, mainly soybeans. Other crops are rice, grain sorghum, and wheat. In some areas, this soil is used as pasture or woodland.

This soil is moderately well suited to cultivated crops. Wetness, poor tilth, and very slow permeability are the main limitations. This soil is difficult to keep in good tilth. It can be worked only within a narrow range of moisture content. It becomes cloddy if tilled when it is too wet or too dry. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Pipe or other drop structures installed in drainage ditches control the water level in ricefields and prevent excessive erosion of ditches. Minimum tillage and crop residue returned to the soil or regular additions of other organic matter improve fertility and help to maintain tilth and the content of organic matter.

This soil is moderately well suited to pasture. The main limitations are wetness and very slow permeability. Common bermudagrass, tall fescue, dallisgrass, small grains, ryegrass, and white clover are the main suitable pasture plants. Shallow ditches can remove excess surface water. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Nitrogen fertilizer is needed for optimum forage production. Lime generally is not needed.

This soil is well suited to southern hardwoods. The production potential is high. Wetness and the clayey surface layer are the main concerns in producing and harvesting timber. Equipment use is limited unless drainage is provided (fig. 5). Conventional methods of harvesting can be used except sometimes during rainy periods, generally from December to June. Trees suitable for planting are eastern cottonwood, American sycamore, and sweetgum.

This soil is poorly suited to urban uses, and has severe limitations for use as building sites and for most sanitary facilities. The main limitations are wetness, very slow permeability, and very high shrink-swell potential. Excess water can be removed by using shallow ditches and providing the proper grade. The effects of shrinking and swelling can be minimized by proper design and by backfilling with material that has low shrink-swell potential. Septic tank absorption fields do not function properly during rainy periods because of wetness and very slow permeability. Sewage lagoons are needed if this soil is used as homesites.

This Sharkey soil is in capability subclass IIIw and in woodland group 2w.

Sk—Sharkey clay, occasionally flooded. This is a level, poorly drained soil in broad, flat areas of the alluvial plain. This soil is subject to occasional flooding. The areas range from about 25 to more than 5,000 acres. Slope is less than 1 percent.

Typically, the surface layer is dark gray, slightly acid clay about 9 inches thick. The subsoil is dark gray and gray, mildly alkaline or moderately alkaline clay to a depth of 60 inches. In places the upper part of the subsoil is strongly acid.

Included in mapping are a few small areas of Alligator, Commerce, Fausse, and Tunica soils. The Alligator, Commerce, and Tunica soils are in slightly higher positions than Sharkey soil. The Alligator soils are more acid in the subsoil. The somewhat poorly drained Commerce soils are loamy throughout, and the Tunica soils have loamy underlying material. The Fausse soils are in depressional areas or swales and are very poorly drained. Also included are a few small areas of Sharkey soils that have slopes of 1 to 3 percent and Sharkey soils that are subject to frequent flooding. The included soils make up about 10 percent of the map unit.

This Sharkey soil has high fertility. Water and air move through this soil very slowly. Water runs off the surface slowly and stands in low places for long periods after heavy rains. A seasonal high water table fluctuates between a depth of about 2 feet and the soil surface from December through April. Adequate water is available to plants in most years. This soil is subject to brief to very long periods of flooding late in winter, in spring, and early in summer. Flooding occurs about 3 times during each 15 year period during the crop growing season and more often during other times of the year. Floodwater typically is 2 to 5 feet deep, but the depth exceeds 8 feet in places. Flood duration can exceed 1 month. The surface layer remains wet for long periods after heavy rains. This soil has very high shrink-swell potential.

This soil is mostly used for cultivated crops, mainly soybeans. Other crops are rice, grain sorghum, and wheat. In some areas, this soil is used as woodland and wildlife habitat.

This soil is somewhat poorly suited to most cultivated crops. Wetness and poor tilth are the main limitations. Flooding is a hazard. Short-season crops can be grown in most years; however, flooding can delay planting dates. This soil is difficult to keep in good tilth, and it can be worked only within a narrow range of moisture content. It becomes cloddy if tilled when it is too wet or too dry. Levees, channels, and pumps can control flooding. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface

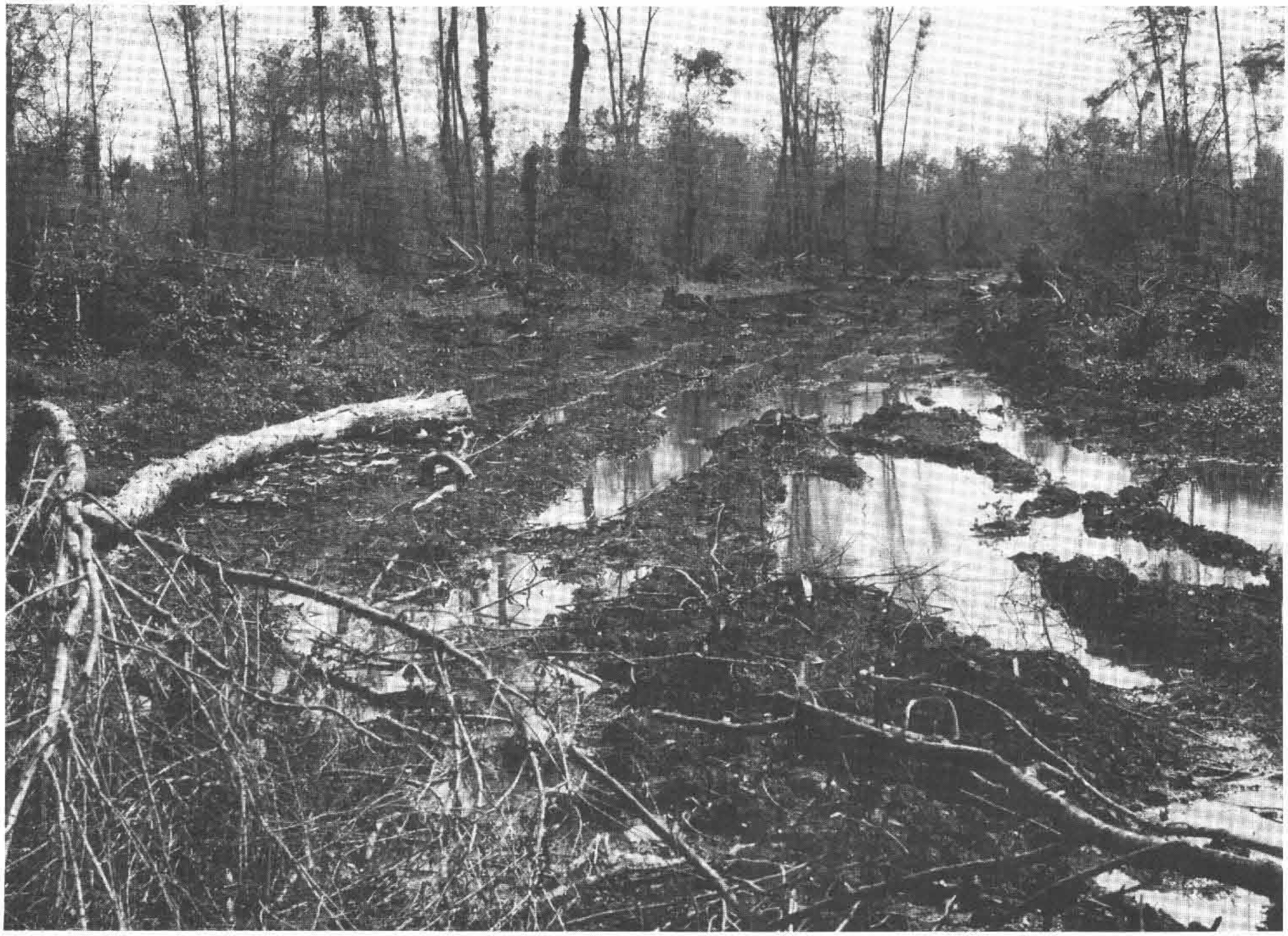


Figure 5.—Wetness and a clayey surface layer are severe limitations to logging operations on this Sharkey clay soil.

water. Minimum tillage and crop residue returned to the soil or regular additions of other organic matter improve fertility and help to maintain tilth and the content of organic matter.

This soil is well suited to southern hardwoods. The production potential is high. Wetness and flooding are the main concerns in producing and harvesting timber. Equipment use is limited unless drainage is provided. Conventional methods of harvesting timber can be used except sometimes during rainy periods, generally from December to June. Trees suitable for planting are eastern cottonwood and American sycamore.

This soil is somewhat poorly suited to pasture. The main limitations are wetness and very slow permeability. Flooding is a hazard. Common bermudagrass is the main suitable pasture plant. Wetness limits the choice of plants and the period of grazing. Shallow ditches can remove excess surface water. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Nitrogen fertilizer is needed for optimum forage production. Lime generally is not needed.

This soil is well suited to use as habitat for woodland and wetland wildlife. Propagation of oaks and other mast-producing trees improves the habitat for squirrels, white-tailed deer, and many species of nongame birds. Habitat for wetland wildlife can be improved by constructing shallow ponds to provide open water areas for waterfowl and furbearers.

This soil is poorly suited to most urban uses. It is not suitable for building sites. The main limitations are wetness, very slow permeability, and very high shrink-swell potential. Flooding is a hazard. Major flood control structures and extensive local drainage systems are needed to protect this soil from flooding. Designs for roads should offset the limitation of the soil to support a load. The effects of shrinking and swelling can be minimized by proper design and by backfilling with material that has low shrink-swell potential. Septic tank absorption fields do not function properly during rainy periods because of wetness and very slow permeability. Sewage lagoons are needed if this soil is used as homesites. Lagoon levees should be of sufficient height to prevent floodwater from entering the lagoon.

This Sharkey soil is in capability subclass IVw and in woodland group 2w.

Sm—Sharkey clay, gently undulating, occasionally flooded. This is a poorly drained soil in low positions on the alluvial plain. It is subject to occasional flooding. The landscape consists of narrow, concave swales and narrow to broad ridges and knolls. Areas range from about 50 to more than 1,500 acres. Slopes are short and choppy and range from 0 to 3 percent.

Typically, the surface layer is very dark grayish brown, medium acid clay about 5 inches thick. The subsoil is dark gray and gray, slightly acid to mildly alkaline clay. In places the upper part of the subsoil is strongly acid. The underlying material to a depth of about 60 inches is dark gray, moderately alkaline silty clay.

Included in mapping are a few small areas of Alligator, Commerce, Fausse, and Tunica soils. The Alligator, Commerce, and Tunica soils are in slightly higher positions than Sharkey soil. The Alligator soils are more acid in the subsoil. The somewhat poorly drained Commerce soils are loamy throughout, and the Tunica soils have loamy underlying material. The Fausse soils are in deep swales and are very poorly drained. Also included are a few small areas of Sharkey soils that have slopes of 3 to 5 percent. The included soils make up about 10 percent of the map unit.

This Sharkey soil has high fertility. Water and air move through this soil very slowly. Water runs off the surface slowly and stands in low places for long periods after heavy rains. A seasonal high water table fluctuates between a depth of about 2 feet and the soil surface from December through April. Adequate water is available to plants in most years. This soil is subject to brief to very long periods of flooding late in winter, in spring, and early in summer. Flooding occurs about 3 times during each 15 year period during the crop growing season and more often at other times of the year. Floodwater typically is 2 to 5 feet deep, but the depth exceeds 8 feet in places. Flood duration can exceed 1 month. The surface layer of this soil remains wet for long periods after heavy rains. This soil has very high shrink-swell potential.

This soil is mostly used for cultivated crops, mainly soybeans. Other crops are grain sorghum and wheat. In some areas, this soil is used as woodland and wildlife habitat.

This soil is poorly suited to most cultivated crops. Wetness, short irregular slopes, and poor tilth are the main limitations. Flooding is a hazard. Short-season crops can be grown in most years; however, flooding can delay planting dates. This soil is difficult to keep in good tilth and it can be worked only within a narrow range of moisture content. It becomes cloddy if tilled when it is too wet or too dry. Irregular slopes hinder tillage operations. Land grading and smoothing improve surface drainage, but in places, large volumes of soil need to be moved. Levees, channels, and pumps can control flooding. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Minimum tillage and crop residue returned to the soil or regular additions of other organic matter improve fertility and help to maintain tilth and the content of organic matter.

This soil is well suited to southern hardwoods. The production potential is high. Wetness and flooding are the main concerns in producing and harvesting timber. Equipment use is limited unless drainage is provided. Conventional methods of harvesting timber can be used except sometimes during rainy periods, generally from December to June. Trees suitable for planting are eastern cottonwood and American sycamore.

This map unit is well suited to use as habitat for woodland and wetland wildlife. Habitat for woodland wildlife can be improved by propagating the natural growth of oak trees and suitable understory plants. Habitat for wetland wildlife can be improved by constructing shallow ponds to provide open water areas for waterfowl and furbearers such as muskrat, nutria, and otter.

This soil is somewhat poorly suited to pasture. The main limitations are wetness and very slow permeability. Flooding is a hazard. Common bermudagrass is the main suitable pasture plant. Wetness limits the choice of plants and the period of grazing. Shallow ditches can remove excess surface water. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Nitrogen fertilizer is needed for optimum forage production. Lime generally is not needed.

This soil is poorly suited to most urban uses. It is not suited to use as building sites. The main limitations are wetness, very slow permeability, and very high shrink-swell potential. Flooding is a hazard. Major flood control structures and extensive local drainage systems are needed to protect this soil from flooding. Structural damage to buildings as a result of shrinking and swelling can be prevented by properly designing foundations and footings, and by diverting runoff away from buildings. Septic tank absorption fields do not function properly during rainy periods because of wetness and very slow permeability. Sewage lagoons are needed if this soil is used as homesites. Lagoon levees should be of sufficient height to prevent floodwaters from entering the lagoon.

This Sharkey soil is in capability subclass IVw and in woodland group 2w.

So—Sharkey clay, frequently flooded. This is a level, poorly drained soil on broad flats and in depressional areas on the alluvial plain. It is subject to frequent flooding. Areas range from about 15 acres to more than 7,500 acres. Slope is less than 1 percent.

Typically, the surface layer is very dark grayish brown and dark gray, medium acid clay about 11 inches thick. The subsoil is dark gray, neutral or mildly alkaline clay. In some places, the surface layer is dark reddish brown clay. In other places the upper part of the subsoil is strongly acid. The underlying material to a depth of about 96 inches is grayish brown, mildly alkaline clay.

Included in mapping are a few small areas of Commerce, Fausse, and Tunica soils. The somewhat poorly drained Commerce soils are in higher positions than Sharkey soil, and they are loamy throughout. The Fausse soils are in deep swales and are very poorly drained. The Tunica soils are in slightly higher positions and have loamy underlying material. Also included are a few small areas of Sharkey soils that have slopes of 1 to 3 percent and Sharkey soils that do not flood frequently. The included soils make up about 10 percent of the map unit.

This Sharkey soil has high fertility. Water and air move through this soil very slowly. Water runs off the surface slowly and stands in low places for long periods after heavy rains. A seasonal high water table fluctuates between a depth of about 2 feet and the soil surface from December through April. Adequate water is available to plants in most years. This soil is subject to brief to very long periods of flooding late in winter, in spring, and early in summer. Flooding occurs about 3 times during each 5 year period during the crop growing season and most years during the winter or spring. Floodwater typically is 2 to 5 feet deep, but the depth exceeds 10 feet in places. The surface layer of this soil remains wet for long periods after heavy rains. This soil has very high shrink-swell potential.

This soil is mostly used as woodland and for wildlife habitat. In a few areas, it is used for short-season crops.

This soil is moderately well suited to use as woodland. The production potential is high for southern hardwoods, but tree stands are difficult to establish because of wetness and frequent flooding. Conventional methods of harvesting timber can be used, but they are severely limited during rainy periods, generally from December to June. Baldcypress is suitable for planting.

This soil is moderately well suited to use as habitat for woodland and wetland wildlife. Habitat for wildlife can be improved by planting appropriate vegetation or by propagating the natural growth of desirable plants.

This soil is poorly suited to most cultivated crops. Wetness and poor tilth are the main limitations. Frequent flooding is a hazard. Soybeans and grain sorghum are the main suitable crops. A drainage system is needed for most cultivated crops and pasture plants. Levees, channels, and pumps can control flooding.

This soil is poorly suited to use as pasture. Wetness is the main limitation. Frequent flooding is a hazard. Wetness limits the choice of plants and the period of grazing. Common bermudagrass is the main suitable pasture plant. Shallow ditches can remove excess surface water.

This soil is not suited to use as homesites. The hazard of flooding is generally too severe. Other limitations are wetness and very high shrink-swell potential. Major flood control structures and extensive local drainage systems are needed to protect this soil from flooding.

This Sharkey soil is in capability subclass Vw and in woodland group 3w.

Sr—Sharkey clay, overwash, occasionally flooded. This is a level, poorly drained soil in low positions on natural levees near the Red River. It is subject to occasional flooding. Areas range from about 100 to 500 acres. Slope is less than 1 percent.

Typically, the surface layer is dark reddish brown, medium acid clay about 10 inches thick. Below this is a buried surface layer of dark gray, slightly acid clay about 6 inches thick. In places the dark reddish brown surface layer is thicker than 20 inches. The subsoil is dark gray, neutral or mildly alkaline clay. The underlying material to a depth of about 65 inches is dark gray, mildly alkaline clay.

Included in mapping are a few small areas of the Latanier and Norwood soils. The somewhat poorly drained Latanier soils are in slightly higher positions than Sharkey soils and have loamy underlying material. The well drained Norwood soils are also in higher positions and are loamy throughout. Also included are a few small areas of Sharkey, overwash soils that have slopes of 1 to 3 percent. The included soils make up about 5 percent of the map unit.

This Sharkey soil has high fertility. Water and air move through this soil slowly. Water runs off the surface slowly and stands in low places for long periods after heavy rains. A seasonal high water table fluctuates between a depth of about 2 feet and the soil surface from December through April. Adequate water is available to plants in most years. This soil is subject to brief to very long periods of flooding late in winter, in spring, and early in summer. Flooding occurs about 3 times during each 15 year period during the crop growing season and more often at other times of the year. Floodwater typically is 2 to 5 feet deep, but the depth exceeds 8 feet in places. Flood duration may exceed 1 month. The surface layer of this soil remains wet for long periods after heavy rains. This soil has very high shrink-swell potential.

This soil is mainly used for cultivated crops, woodland, or wildlife habitat.

This soil is somewhat poorly suited to most cultivated crops. Wetness and poor tilth are the main limitations. Flooding is a hazard. Soybeans is the main crop, but rice and grain sorghum are also grown. Short-season crops can be grown in most years; however, flooding may delay planting dates. This soil is difficult to keep in good tilth, and it can be worked only within a narrow range of moisture content. It becomes cloddy if tilled when it is too wet or too dry. Levees, channels, and pumps can control flooding. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Minimum tillage, crop residue returned to the soil, or regular additions of other organic matter improve fertility and help to maintain soil tilth and the content of organic matter.

This soil is well suited to southern hardwoods. The production potential is high. Wetness and flooding are the main concerns in producing and harvesting timber. Equipment use is limited unless drainage is provided. Conventional methods of harvesting timber can be used except sometimes during rainy periods, generally from December to June. Trees suitable for planting are eastern cottonwood and American sycamore.

This soil is somewhat poorly suited to use as pasture. Wetness is the main limitation. Flooding is a hazard. Wetness limits the choice of plants and the period of grazing. Common bermudagrass is the main suitable pasture plant. Shallow ditches can remove excess surface water. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Nitrogen fertilizer is needed for optimum forage production. Lime generally is not needed.

This soil is well suited to use as habitat for woodland and wetland wildlife. Propagating oaks and other mast-producing trees improves the habitat for squirrels, white-tailed deer, and many species of nongame birds. Habitat for wetland wildlife can be improved by constructing shallow ponds to provide open water areas for waterfowl and furbearers.

This map unit is poorly suited to most urban uses. It is not suitable for building sites. The main limitations are wetness and very high shrink-swell potential. Flooding is a hazard. Major flood control structures and extensive local drainage systems are needed to protect this soil from flooding. Structural damage to buildings as a result of shrinking and swelling can be prevented by properly designing foundations and footings, and by diverting runoff away from buildings.

This Sharkey soil is in capability subclass IVw and woodland group 2w.

SS—Sostien-Cocodrie association, occasionally flooded. The level to gently sloping, poorly drained Sostien soil and moderately well drained Cocodrie soil are on spoil banks on the alluvial plain of the Mississippi River. The soil material has been dredged from canals and pumped into areas of this map unit. These soils are subject to occasional flooding. Areas are rectangular and range from 150 to 1,000 acres. The Sostien soil makes up about 50 percent of the areas mapped and the Cocodrie soil about 45 percent. The Sostien soil typically is in slightly lower positions than the Cocodrie soil. Slopes are generally short and range from 0 to 3 percent. The observations were fewer than in other areas. The detail in mapping, however, is adequate for the expected use of the soils.

The soils of this association are subject to long periods of flooding late in winter, in spring, and early in summer. Flooding occurs about 3 times during each 15 year period during the crop growing season and more often at other times of the year. Floodwater typically is 2 to 5 feet deep, but the depth exceeds 8 feet in places. Flood duration may exceed 1 month.

Typically, Sostien soil has a surface layer of very dark grayish brown, slightly acid clay about 6 inches thick. The underlying material to a depth of about 60 inches is gray and dark gray, neutral clay with thin strata and pockets of sand.

The Sostien soil has high fertility. Water runs off the surface slowly and ponds in low places for long periods after heavy rains. Water and air move through this soil very slowly. Adequate water is available to plants in most years. A seasonal high water table fluctuates between a depth of 2 feet and the soil surface from December to April. This soil has very high shrink-swell potential.

Typically, Cocodrie soil has a surface layer of dark grayish brown, mildly alkaline very fine sandy loam about 3 inches thick. The underlying material to a depth of about 65 inches is stratified brown, moderately alkaline very fine sandy loam.

The Cocodrie soil has high fertility. Water and air move through this soil at a moderate rate. Water runs off the surface slowly. Plants are damaged by lack of water during dry periods in summer and in fall of some years. A seasonal high water table is 2 to 3 feet below the surface from December to April. Shrink-swell potential is low.

Included in mapping are a few small areas of Crevasse and Fausse soils. The excessively drained Crevasse soils are generally in slightly higher positions than the Sostien and Cocodrie soils, and they are sandier throughout. The very poorly drained Fausse soils are in depressional areas and remain wet most of the year. Also included are a few small areas of Sostian and soils that have a silt loam or silty clay loam surface layer and Cocodrie soils that have a silt loam, silty clay loam, or clay surface layer. The included soils make up about 5 percent of the map unit.

Most areas of this map unit are wooded and are used for wildlife habitat. A few areas are used as pasture.

The soils of this map unit are well suited to use as habitat for woodland wildlife and moderately well suited to use as habitat for wetland wildlife. Propagating oaks and other mast-producing trees improves the habitat for squirrels, white-tailed deer, and many species of nongame birds and animals. Habitat for wetland wildlife can be improved by constructing shallow ponds to provide open water areas for waterfowl and furbearers.

The soils of this map unit are well suited to southern hardwoods. Flooding restricts logging operations in some years. The Sostien soil has a high production potential, but it has a clayey surface layer that limits the use of equipment during wet periods. The Cocodrie soil has a very high production potential and has few limitations for use and management. Eastern cottonwood and American sycamore are trees suitable for planting in these soils.

This map unit is somewhat poorly suited to cultivated crops. Flooding restricts choice of crops and delays or prohibits planting in some years. Soybeans and grain sorghum are suitable crops. The Sostien soil is difficult to keep in good tilth. It is sticky when wet and hard when dry, and it becomes cloddy if it is tilled when it is too wet or too dry. The Cocodrie soil is friable, easy to keep in good tilth, and can be worked throughout a wide range of moisture content. A drainage system is needed for most cultivated crops and pasture plants. Land smoothing improves surface drainage and permits more efficient use of farm equipment. Crop residue left on or near the surface helps to conserve moisture, maintain tilth, and control erosion.

This map unit is somewhat poorly suited to pasture. Flooding restricts choice of pasture plants and limits grazing during some years. Common bermudagrass is the main suitable pasture plant. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition. Nitrogen fertilizer is needed for optimum forage production. Lime generally is not needed.

This map unit is poorly suited to most urban uses. It is not suitable for building sites. Flooding is a hazard. Limitations of the Sostien soil are wetness, very slow permeability, and very high shrink-swell potential. The Cocodrie soil has no additional limitations. If buildings are constructed on areas of this association the Cocodrie soil is more suitable for this use. Major flood control structures are needed to protect this map unit from flooding.

This Sostien soil is in capability subclass IVw and in woodland group 2w. The Cocodrie soil is in capability subclass IIIw and in woodland group 1w.

ST—Sostien-Crevasse association, 0 to 5 percent slopes. These gently sloping, poorly drained Sostien soils and excessively drained Crevasse soils are on spoil banks on the alluvial plain of the Mississippi River. The soil material has been dredged from canals and pumped into areas of this map unit. Areas are long and narrow and range from 50 to 600 acres. The Sostien soils make up about 60 percent of the areas mapped and the Crevasse soils about 30 percent. The Sostien soils typically are in lower positions than the Crevasse soils. Slopes are generally short and irregular. The observations were fewer than in other areas. The detail in mapping, however, is adequate for the expected use of the soils.

Typically, the Sostien soil has a surface layer of dark grayish brown, moderately alkaline clay about 4 inches thick. The underlying material to a depth of about 65 inches is gray moderately alkaline clay with thin strata and pockets of fine sand.

The Sostien soil has high fertility. Water runs off the surface at a medium rate. Water and air move through this soil very slowly. Adequate water is available to plants in most years. A seasonal high water table fluctuates between a depth of 2 feet and the soil surface from December to April. Flooding is rare, but it can occur during periods of prolonged, high intensity rainfall at any time during the year. This soil has very high shrink-swell potential.

Typically, the Crevasse soil has a surface layer of yellowish brown, mildly alkaline fine sand about 4 inches thick. The underlying material to a depth of about 65 inches is thinly bedded, brown, mildly alkaline fine sand. Thin strata and pockets of finer textured materials are common. In places the underlying material is silty clay loam or clay between depths of 40 and 60 inches.

The Crevasse soil has low fertility. Water runs off the surface slowly. Water and air move through this soil rapidly. Plants generally suffer from a lack of water during dry periods in summer and fall of most years. A seasonal high water table is about 3.5 to 6 feet below the surface from December to April of most years. Flooding is rare, but it can occur under unusually wet conditions at any time during the year. Shrink-swell potential is low.

Included in mapping are a few small areas of the Cocodrie soils. The Cocodrie soils are on some side slopes. These soils contain more clay than Crevasse soils and less clay than Sostien soils. Also included are a few small areas of Sostien and Crevasse soils that are subject to occasional flooding and a few small areas of Sostien soils that have a silt loam or very fine sandy loam surface layer. The included soils make up about 10 percent of the map unit.

Most areas of this map unit are wooded and are used for wildlife habitat. In a few areas, the soils are used as pasture.

The soils of this map unit are well suited to use as habitat for woodland wildlife. Propagating oaks and other mast-producing trees improves the habitat for squirrels, white-tailed deer, and many species of nongame birds and animals.

This map unit is moderately well suited to southern hardwoods. The clayey surface layer of the Sostien soil limits the use of logging equipment during wet periods. Stands of trees are difficult to establish on Crevasse soils because of low water holding capacity. The sandy texture also restricts the use of logging equipment during dry periods. Eastern cottonwood and American sycamore are trees suitable to plant in these soils.

This map unit is poorly suited to most cultivated crops. Short, irregular slopes are a limitation for this use in areas of both the Sostien and Crevasse soils. Runoff is medium on the Sostien soil, and the erosion hazard is moderate. The Sostien soil is difficult to keep in good tilth. It is sticky when wet and hard when dry, and it becomes cloddy if it is tilled when it is too wet or too dry. The Crevasse soil is droughty and has poor trafficability when dry. All tillage should be on the contour or across the slope. Crop residue left on or near the surface helps to conserve moisture, maintain tilth, and control erosion.

The soils of this map unit are moderately well suited to pasture. The main limitations are wetness in the Sostien soil and droughtiness in the Crevasse soil. Common bermudagrass, improved bermudagrass, dallisgrass, tall fescue, ryegrass, and white clover are the main suitable pasture plants. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soils in good condition.

This map unit is poorly suited to urban uses. If the Crevasse soil is used for homesites, the main limitations are droughtiness and seepage. Flooding is a hazard. If the Sostien soil is used, the main limitations are wetness, very high shrink-swell potential, and very slow permeability. Flooding is a hazard.

This Sostien soil is in capability subclass IIIe and woodland group 2w. The Crevasse soil is in capability subclass IVs and woodland group 2s.

Tc—Tensas silty clay. This is a level, somewhat poorly drained soil in intermediate positions on natural levees of old Mississippi River channels. Areas are long and narrow and range from 15 to 650 acres. Slope is less than 1 percent.

Typically, the surface layer is dark grayish brown, strongly acid silty clay about 5 inches thick. The subsoil is grayish brown and dark grayish brown, very strongly acid clay and silty clay in the upper part; and grayish brown, strongly acid or medium acid silty clay and clay loam in the lower part. The underlying material to a depth of about 65 inches is grayish brown, medium acid clay loam.

Included in mapping are a few small areas of Alligator and Dundee soils. The Alligator soils are in lower positions than Tensas soil, and they are clayey throughout. The Dundee soils are in higher positions and are loamy throughout. Also included are a few small areas of Tensas soils that have a silty clay loam surface layer. The included soils make up about 10 percent of the map unit.

This soil has medium fertility. Water and air move through the upper part of this soil very slowly and through the lower part at a moderately slow rate. Water runs off the surface at a medium rate. Adequate water is available to plants in most years. A seasonal high water table is about 1 foot to 3 feet below the surface from December through April. Some lower-lying areas adjacent to drainageways are subject to rare flooding from local runoff during prolonged, high-intensity rainfall. This can occur at any time of the year. The surface layer of this soil remains wet for long periods after heavy rains. The soil has very high shrink-swell potential.

This soil is mostly used for cultivated crops, mainly soybeans. Small acreages are used as woodland, pasture, or homesites.

This soil is moderately well suited to most cultivated crops. Wetness and poor tilth are the main limitations. Soybeans, rice, grain sorghum, and small grains are the main suitable crops. This soil is difficult to keep in good tilth. It can be worked only within a narrow range of moisture content. It becomes cloddy if tilled when it is too wet or too dry (fig. 6). Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Proper irrigation systems are needed for rice production. Pipe or other drop structures installed in drainage ditches control the water level in ricefields and prevent excessive erosion of ditches. Crop residue left on or near the surface helps to conserve moisture, maintain tilth, and control erosion. Most crops and pasture plants respond well to fertilizer. Lime generally is needed.

This soil is well suited to southern hardwoods. Wetness is the main concern in producing and harvesting timber. The clayey surface layer limits the use of equipment during wet periods. Conventional methods of harvesting timber can be used except sometimes during rainy periods, generally from December to April. Trees suitable for planting are eastern cottonwood and American sycamore.

This soil is moderately well suited to pasture. The main limitations are wetness and very slow permeability. Common bermudagrass, improved bermudagrass, tall fescue, ryegrass, white clover, and small grains are the main suitable pasture plants. Shallow ditches can remove excess surface water. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

This soil is poorly suited to urban uses. It has severe limitations for building sites, local roads and streets, and most sanitary facilities. The main limitations are wetness, low strength as it affects local roads and streets, very slow permeability, and very high shrink-swell potential.

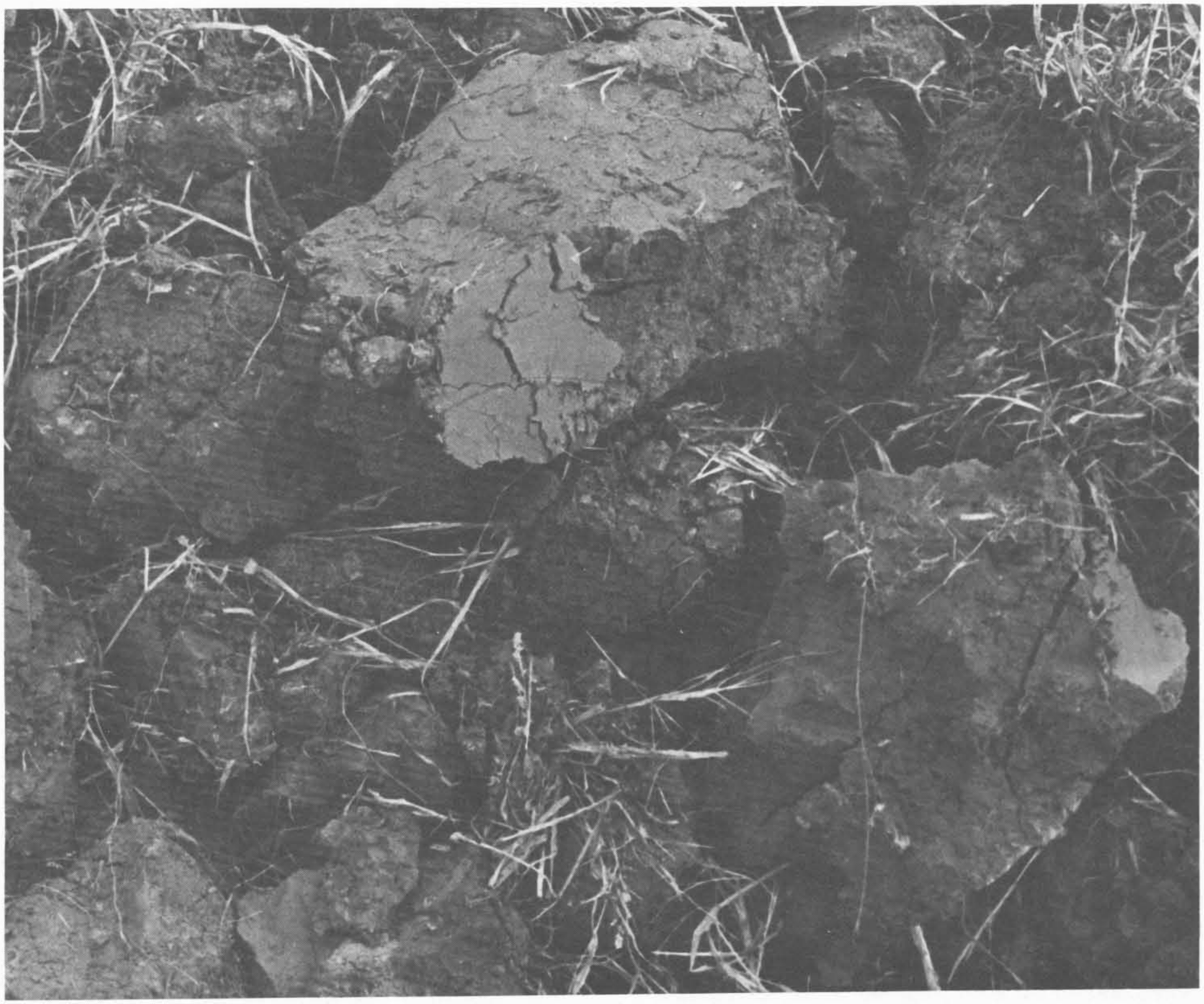


Figure 6.—Large clods form when Tensas silty clay soil is plowed while wet. A good seedbed is difficult to obtain if this soil is plowed when it is too wet or too dry.

Flooding is a hazard. Excess water can be removed by using shallow ditches and providing the proper grade. Because of wetness and slow permeability, septic tank absorption fields do not function properly during rainy periods unless internal drainage is improved. Sewage lagoons are needed if this soil is used for homesites. The effects of shrinking and swelling can be minimized by proper design and by backfilling with material that has low shrink-swell potential.

This Tensas soil is in capability subclass IIIw and in woodland group 2w.

Te—Tensas silty clay, occasionally flooded. This is a level, somewhat poorly drained soil in intermediate positions on natural levees of old Mississippi River channels. This soil is subject to occasional flooding. Areas are long and narrow and range from 10 to 550 acres. Slope is less than 1 percent.

Typically, the surface layer is dark grayish brown, medium acid silty clay about 4 inches thick. The subsoil is grayish brown, strongly acid clay and silty clay in the upper part; and grayish brown, strongly acid loam in the lower part. The underlying material to a depth of about 64 inches is grayish brown, medium acid clay loam.

Included in mapping are a few small areas of Alligator and Dundee soils. The Alligator soils are in lower positions and are clayey throughout. The Dundee soils are in higher positions, adjacent to drainageways, and are loamy throughout. Also included are a few small areas of Tensas soils that rarely flood and soils that have a silty clay loam surface layer. The included soils make up about 10 percent of the map unit.

This soil has medium fertility. Water and air move through the upper part of this soil very slowly and through the lower part at a moderately slow rate. Water runs off the surface at a medium rate. Adequate water is available to plants in most years. A seasonal high water table is about 1 foot to 3 feet below the surface from December through April. These soils are subject to brief to long periods of flooding late in winter, in spring, and early in summer. Flooding occurs about 2 times during each 15 year period during the crop growing season and more often at other times of the year. Floodwater typically is 1 foot to 3 feet deep, but the depth exceeds 5 feet in places. This soil has very high shrink-swell potential.

This soil is mostly used for cultivated crops, mainly soybeans. Small acreages are used as woodland, pasture, or homesites.

This soil is somewhat poorly suited to most cultivated crops. Wetness and poor tilth are the main limitations. Occasional flooding is a hazard. Short-season crops can be grown in most years; however, flooding may delay planting dates. This soil is difficult to keep in good tilth. It can be worked only within a narrow range of moisture content. It becomes cloddy if tilled when it is too wet or too dry. Levees, channels, and pumps can control flooding. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Crop residue left on or near the surface helps to conserve moisture, maintain tilth, and control erosion. Most crops and pasture plants respond well to fertilizer. Lime generally is needed.

This soil is well suited to southern hardwoods. The main concerns in producing and harvesting timber are flooding and wetness. The clayey surface layer limits the use of equipment during wet periods. Conventional methods of harvesting timber can be used, except sometimes during rainy periods, generally from December to April. Trees suitable for planting are eastern cottonwood and baldcypress.

This soil is somewhat poorly suited to pasture. Wetness is the main limitation. Flooding is a hazard. Common bermudagrass is the main suitable pasture plant. Shallow ditches can remove excess surface water. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

This soil is poorly suited to most urban uses. It is not suitable for building sites. The main limitations are wetness, very slow permeability, and very high shrink-swell potential. Flooding is a hazard. Major flood control structures and extensive local drainage systems are needed to protect this soil from flooding. Excess water can be removed by using shallow ditches and providing the proper grade. Septic tank absorption fields do not function properly during rainy periods because of wetness and very slow permeability. Sewage lagoons are needed if this soil is used as homesites. The effects of shrinking and swelling can be minimized by proper design and by backfilling with material that has low shrink-swell potential.

This Tensas soil is in capability subclass IVw and woodland group 2w.

To—Tensas-Alligator complex, undulating. These somewhat poorly drained Tensas soils and poorly drained Alligator soils are in intermediate and low positions on natural levees of old Mississippi River channels. The landscape consists of low, parallel ridges and swales. The ridges are 1 foot to 5 feet high and about 120 to 300 feet wide. The swales are about 50 to 300 feet wide. The somewhat poorly drained Tensas soil is on the convex ridges and the Alligator soil is in the swales between the ridges. Slope ranges from less than 1 percent on ridgetops and in swales to about 5 percent on the side slopes of ridges.

Areas of this complex range from 50 to 750 acres and contain 45 percent Tensas soils and about 40 percent Alligator soils. The components of this complex were so intricately intermingled that it was not practical to map them separately at the scale used.

Typically, the Tensas soil has a surface layer of dark grayish brown, very strongly acid silty clay about 5 inches thick. The subsoil is grayish brown and dark grayish brown, very strongly acid clay in the upper part; grayish brown, strongly acid clay loam in the middle part; and grayish brown, strongly acid silty clay loam and very fine sandy loam in the lower part.

The Tensas soil has medium fertility. Water and air move through the upper part of this soil very slowly and through the lower part at a moderately slow rate. Water runs off the surface at a medium rate. Adequate water is available to plants in most years. A seasonal high water table is about 1 foot to 3 feet below the surface from December through April. This soil has very high shrink-swell potential.

Typically, the Alligator soil has a surface layer of dark grayish brown, strongly acid clay about 7 inches thick. The subsoil is dark gray and gray, very strongly acid clay in the upper part and dark gray, strongly acid clay in the lower part. The underlying material to a depth of about 60 inches is gray and dark gray, medium acid silty clay and silty clay loam.

The Alligator soil has medium fertility. Water and air move through this soil very slowly. Water runs off the surface very slowly and ponds in low places for long periods after heavy rains. This soil is subject to rare flooding by runoff from higher elevations during heavy rains. This can occur at any time of the year. Adequate water is available to plants in most years. A seasonal high water table is about 0.5 foot to 2 feet below the surface from January through April. This soil has very high shrink-swell potential.

Included in mapping are a few small areas of Dundee and Fausse soils. The Dundee soils are on the higher parts of some ridges and are loamy throughout. The very poorly drained Fausse soils are in the lowest positions in some swales and remain wet most of the year. Also included are a few small areas of Tensas soils that have slopes steeper than 5 percent, soils that have a silty clay loam surface layer, and a few small areas of Alligator soils that are slightly acid or neutral in the lower part of the subsoil. The included soils make up about 15 percent of the map unit.

Most areas of this complex are used for cultivated crops, mainly soybeans. A few small areas are used as pasture or homesites. A few large areas remain forested and are used for timber production and wildlife habitat.

This map unit is somewhat poorly suited to most cultivated crops. Short, choppy slopes, wetness, and poor tilth are the main limitations. Runoff is medium on the Tensas soil and the hazard of erosion is moderate. Soybeans, grain sorghum, and wheat are the main suitable crops. The soils are sticky when wet and hard when dry, and form clods if tilled when they are too wet or too dry. Irregular slopes hinder tillage operations. A drainage system is needed for most cultivated crops and pasture plants. Land grading and smoothing improve surface drainage, but in places, large volumes of soil need to be moved. Crop residue left on or near the surface helps to conserve moisture, maintain tilth, and control erosion. Most crops and pasture plants respond well to fertilizer. Lime generally is needed.

This map unit is well suited to the production of eastern cottonwood and American sycamore. Wetness is the main concern in producing and harvesting timber. The clayey surface layer limits the use of equipment during wet periods. Conventional methods of harvesting timber can be used except sometimes during rainy periods, generally from December to April.

This map unit is moderately well suited to pasture. The main limitations are wetness and very slow permeability. Common bermudagrass, improved bermudagrass, tall fescue, dallisgrass, ryegrass, white clover, and small grains are the main suitable pasture plants. Shallow ditches can remove excess surface water. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Fertilizer and lime are generally needed for optimum forage production.

This unit is poorly suited to urban uses. It has severe limitations for building sites, local roads and streets, and most sanitary facilities. The main limitations are wetness, very slow permeability, very high shrink-swell potential, and low strength as it affects local roads and streets. Flooding is a hazard. If buildings are constructed in areas of this map unit, Tensas soil is the more suitable soil for this use. Excess water can be removed by using shallow ditches and providing the proper grade. Septic tank absorption fields do not function properly during rainy periods because of wetness and very slow permeability. Sewage lagoons are needed if these soils are used for homesites. The effects of shrinking and swelling can be minimized by proper design and by backfilling with material that has low shrink-swell potential.

This map unit is in capability subclass IIIw and in woodland group 2w.

Tr—Tensas-Alligator complex, undulating, occasionally flooded. The somewhat poorly drained Tensas soil and the poorly drained Alligator soil are on natural levees of old Mississippi River channels. The landscape consists of ridges and swales. The ridges are 1 foot to 5 feet high and about 100 to 300 feet wide. The swales are about 50 to 300 feet wide. The Tensas soil is on the convex ridges and the Alligator soil is in the swales between the ridges. These soils are subject to occasional flooding for brief to long periods. Flooding occurs about 3 times during each 15 year period during the crop growing season and more often at other times of the year. Floodwater typically is 1 foot to 3 feet deep, but the depth exceeds 5 feet in places. Slopes range from less than 1 percent on ridgetops and in swales to about 5 percent on the sides of ridges.

Areas range from 50 to 750 acres and contain 45 percent Tensas soils and about 40 percent Alligator soils. The components of this map unit were so intricately intermingled that it was not practical to map them separately.

Typically, the Tensas soil has a surface layer of dark grayish brown, very strongly acid silty clay about 4 inches thick. The subsoil to a depth of about 60 inches is grayish brown, very strongly acid clay and silty clay in the upper part; and grayish brown, strongly acid loam and very fine sandy loam in the lower part.

The Tensas soil has medium fertility. Water and air move through the upper part of this soil very slowly and through the lower part at a moderately slow rate. Water runs off the surface at a medium rate. Adequate water is available to plants in most years. A seasonal high water table is about 1 foot to 3 feet below the surface from December through April. This soil has very high shrink-swell potential.

Typically, the Alligator soil has a surface layer of dark grayish brown, very strongly acid clay about 7 inches thick. The subsoil is dark gray and gray, very strongly acid or strongly acid clay. In places the lower part of the subsoil is slightly acid or neutral. The underlying material to a depth of about 60 inches is dark gray, slightly acid silty clay.

The Alligator soil has medium fertility. Water and air move through this soil very slowly. Water runs off the surface very slowly and ponds in low places for long periods after heavy rains. Adequate water is available to plants in most years. A seasonal high water table is about 0.5 foot to 2 feet below the surface from December through April. This soil has very high shrink-swell potential.

Included is mapping are a few small areas of Dundee and Fausse soils. The Dundee soils are on the higher parts of some ridges and are loamy throughout. The very poorly drained Fausse soils are in the lowest positions in some swales and remain wet most of the year. Also included are a few small areas of Tensas and Alligator soils that are rarely subject to flooding and Tensas soils that have a silty clay loam surface layer. The included soils make up about 15 percent of the map unit.

Most soils in this map unit are used for cultivated crops, mainly soybeans. In a few areas, the soils are used as woodland, pasture, or homesites.

The soils of this map unit are poorly suited to most cultivated crops. Wetness, poor tilth, and short, choppy slopes are the main limitations. Flooding is a hazard (fig. 7). Runoff is medium and the hazard of erosion is moderate. Soybeans and grain sorghum are the main suitable crops. The soils are sticky when wet and hard when dry, and form clods if tilled when they are too wet or too dry. Levees, channels, and pumps can control flooding. Irregular slopes hinder tillage operations. A drainage system is needed for most cultivated crops and pasture plants. Land grading and smoothing improve surface drainage, but in places, large volumes of soil need to be moved. Crop residue left on or near the surface helps to conserve moisture, maintain tilth, and control erosion. Most crops and pasture plants respond well to fertilizer. Lime generally is needed.

This map unit is well suited to southern hardwoods. Flooding and wetness are the main concerns in producing and harvesting timber. The clayey surface layer limits the use of equipment during wet periods. Conventional methods of harvesting timber can be used, except sometimes during rainy periods, generally from December to April. Trees suitable for planting are eastern cottonwood, sweetgum, American sycamore, and baldcypress.

This map unit is somewhat poorly suited to pasture. Wetness is the main limitation. Flooding is a hazard. Common bermudagrass is the main suitable pasture plant. Shallow ditches can remove excess surface water. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

This map unit is poorly suited to most urban uses. It is not suitable for building sites. The main limitations are flooding, wetness, very slow permeability, and very high shrink-swell potential. Flooding is a hazard. If buildings are constructed in areas of this map unit, Tensas soil is more suitable for this use. Major flood control structures and extensive local drainage systems are needed to protect this map unit from flooding. Septic tank absorption fields do not function properly during rainy periods because of wetness and very slow permeability. The effects of shrinking and swelling can be minimized by proper design and by backfilling with material that has low shrink-swell potential.

The soils of this complex are in capability subclass IVw and in woodland group 2w.

Ts—Tunica clay. This is a level, poorly drained soil on intermediate positions on natural levees of the Mississippi River. Areas are long and narrow and range from 10 to 350 acres. Slope is less than 1 percent.

Typically, the surface layer is dark grayish brown, slightly acid clay about 6 inches thick. The subsoil is dark gray, slightly acid clay. The underlying material to a depth of about 80 inches is dark gray, grayish brown, and olive gray, neutral to moderately alkaline, silty clay loam, very fine sandy loam, and silt loam.

Included in mapping are a few small areas of Commerce, Newellton, and Sharkey soils. The Commerce soils are in higher positions than Tunica soil, and they are loamy throughout. The Newellton soils are also in slightly higher positions and have loamy material within 20 inches of the surface. The Sharkey soils are in slightly lower positions than Tunica soil, and they are clayey throughout. Also included are a few small areas of Tunica soils that have a silty loam or silty clay loam surface layer. The included soils make up about 10 percent of the map unit.

This soil has high fertility. Water and air move through the upper part of this soil very slowly and through the lower part at a moderately slow rate. Water runs off the surface slowly. Adequate water is available to plants in most years. A seasonal high water table is about 1.5 to 3 feet below the surface from January through April. Flooding is rare, but it can occur during unusually intense, prolonged rainstorms at any time of the year. The surface layer of this soil remains wet for long periods after heavy rains. This soil has high shrink-swell potential.

This soil is mostly used for cultivated crops, mainly soybeans. Small acreages are used as woodland, pasture, or homesites.

This soil is moderately well suited to most cultivated crops. Wetness, very slow permeability, and poor tilth are the main limitations. Soybeans, rice, grain sorghum, and small grains are the main suitable crops. This soil is difficult to keep in good tilth. It can be worked only within a narrow range of moisture content. It becomes cloddy if

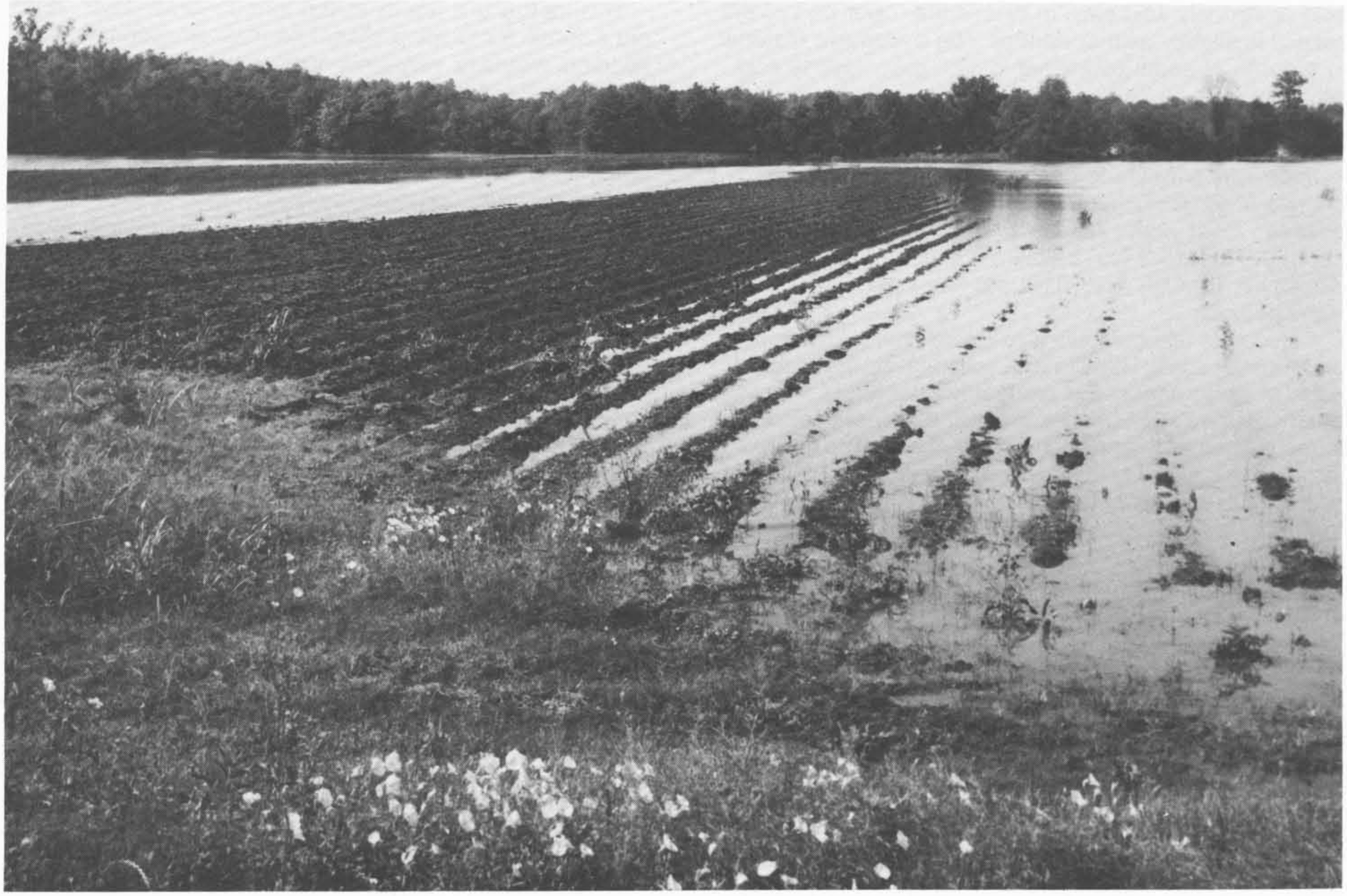


Figure 7.—Flooding delays planting or harvesting of crops in areas of Tensas-Alligator complex, undulating, occasionally flooded.

tilled when it is too wet or too dry. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Proper irrigation systems are needed for rice production. Pipe or other drop structures installed in drainage ditches control the water level in ricefields and prevent excessive erosion of ditches. Crop residue left on or near the surface helps to conserve moisture, maintain tilth, and control erosion. Most crops and pasture plants respond well to fertilizer. Lime generally is not needed.

This soil is well suited to eastern cottonwood, American sycamore, and sweetgum. Wetness is the main concern in producing and harvesting timber. The clayey surface layer limits the use of equipment during wet periods. Conventional methods of harvesting timber can be used except sometimes during rainy periods, generally from December to April.

This soil is moderately well suited to pasture. The main limitations are wetness and very slow permeability. Common bermudagrass, improved bermudagrass, tall fescue, dallisgrass, ryegrass, white clover, and small grains are the main suitable pasture plants. Shallow ditches can remove excess surface water. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Nitrogen fertilizer is needed for optimum forage production. Lime generally is not needed.

This soil is poorly suited to urban uses. It has severe limitations for building sites, local roads and streets, and most sanitary facilities. The main limitations are wetness, very slow permeability, very high shrink-swell potential, and low strength as it applies to local roads and streets. Excess water can be removed by using shallow ditches and providing the proper grade. Septic tank absorption fields do not function properly during rainy periods because of wetness and very slow permeability. Sewage lagoons are needed if this soil is used as homesites. The effects of shrinking and swelling can be minimized by proper design and by backfilling with material that has low shrink-swell potential.

This Tunica soil is in capability subclass IIIw and in woodland group 2w.

Tt—Tunica clay, occasionally flooded. This is a level, poorly drained soil on intermediate positions on natural levees of the Mississippi River. It is subject to occasional flooding. Areas are long and narrow and range from 10 to 350 acres. Slope is less than 1 percent.

Typically, the surface layer is very dark grayish brown, slightly acid clay about 4 inches thick. The subsoil is dark gray, slightly acid clay. The underlying material to a depth of about 65 inches is dark grayish brown, neutral silty clay loam and grayish brown silt loam.

Included in mapping are a few small areas of Commerce, Newellton, and Sharkey soils. The Commerce soils are in higher positions than Tunica soil and are loamy throughout. The Newellton soils are also in slightly higher positions and have loamy material within 20 inches of the surface. The Sharkey soils are in slightly lower positions and are clayey throughout. Also included are a few small areas of Tunica soils that have slopes of 1 to 3 percent and soils that have a silt loam or silty clay loam surface layer. The included soils make up about 10 percent of the map unit.

This soil has high fertility. Water and air move through the upper part of this soil very slowly and through the lower part at a moderately slow rate. Water runs off the surface slowly. Adequate water is available to plants in most years. A seasonal high water table is about 1.5 to 3 feet below the surface from January through April. These soils are subject to brief to long periods of flooding. Flooding occurs about 3 times during each 15 year period during the crop growing season and more often at other times of the year. Floodwater typically is 2 to 5 feet deep, but the depth exceeds 8 feet in places. This soil has high shrink-swell potential.

This soil is mostly used for cultivated crops, mainly soybeans. Small acreages are used as woodland, pasture, or homesites.

This soil is somewhat poorly suited to most cultivated crops. Wetness and poor tilth are the main limitations. Occasional flooding is a hazard. Short-season crops can be grown in most years; however, planting dates may be delayed. This soil is difficult to keep in good tilth. It can be worked only within a narrow range of moisture content. It becomes cloddy if tilled when it is too wet or too dry. Levees, channels, and pumps can control flooding. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Crop residue left on or near the surface helps to conserve moisture, maintain tilth, and control erosion. Most crops and pasture plants respond well to fertilizer. Lime generally is not needed.

This soil is well suited to eastern cottonwood, American sycamore, and sweetgum. The main concerns in producing and harvesting timber are flooding and wetness. The clayey surface layer limits the use of equipment during wet periods. Conventional methods of harvesting timber can be used except sometimes during rainy periods, generally from December to April.

This soil is somewhat poorly suited to pasture. Wetness is the main limitation. Flooding is a hazard. Common bermudagrass is the main suitable pasture plant. Shallow ditches can remove excess surface water. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Nitrogen fertilizer is needed for optimum forage production. Lime generally is not needed.

This soil is poorly suited to for most urban uses. It is not suitable for building sites. The main limitations are wetness, very slow permeability, and very high shrink-swell potential. Flooding is a hazard. Major flood control structures and extensive local drainage systems are needed to protect this soil from flooding. Excess water can be removed by using shallow ditches and providing the proper grade. Septic tank absorption fields do not function properly during rainy periods because of wetness and very slow permeability. The effects of shrinking and swelling can be minimized by proper design and by backfilling with material that has low shrink-swell potential.

This Tunica soil is in capability subclass IVw and in woodland group 2w.

Tu—Tunica-Sharkey complex, gently undulating. These poorly drained soils are in low positions on natural levees of the Mississippi River. The landscape consists of low, parallel ridges and swales. The ridges are 1 foot to 3 feet high and about 120 to 350 feet wide. The swales are about 50 to 300 feet wide. The Tunica soil is on the convex ridges and the Sharkey soil is in the swales between the ridges. Slopes range from less than 1 percent on ridgetops and in swales to about 3 percent on the side slopes of ridges.

Areas range from 50 to 750 acres and contain 45 percent Tunica soils and about 40 percent Sharkey soils. The components of this complex were so intricately intermingled that it was not practical to map them separately.

Typically, the Tunica soil has a surface layer of very dark grayish brown, medium acid clay about 5 inches thick. The subsoil is dark gray, medium acid and slightly acid clay. The underlying material to a depth of about 65 inches is grayish brown, neutral and mildly alkaline silty clay loam, silt loam, and very fine sandy loam.

The Tunica soil has high fertility. Water and air move through the upper part of this soil very slowly and through the lower part at a moderately slow rate. Water runs off the surface at a medium rate. Adequate water is available to plants in most years. A seasonal high water table is about 1.5 to 3 feet below the surface from January through April. This soil has high shrink-swell potential.

Typically, the Sharkey soil has a surface layer of very dark grayish brown, medium acid clay about 4 inches thick. The subsoil is dark gray, slightly acid or neutral clay. The underlying material to a depth of about 60 inches, is dark gray and gray, mildly alkaline silty clay.

The Sharkey soil has high fertility. Water and air move through this soil very slowly. Water runs off the surface very slowly and stands in low places for long periods after heavy rains. This soil is subject to rare flooding caused by runoff from higher elevations during prolonged, high-intensity storms. This can occur at any time during the year. Adequate water is available to plants in most years. A seasonal high water table fluctuates between a depth of about 2 feet and the soil surface from December through April. This soil has very high shrink-swell potential.

Included in mapping are a few small areas of Commerce, Fausse, and Newellton soils. The Commerce soils are in higher positions on some ridges and are loamy throughout. The very poorly drained Fausse soils are in the lowest parts of some swales and remain wet most of the year. The Newellton soils are also in slightly higher positions on some ridges and have loamy material within 20 inches of the surface. Also included are a few small areas of Tunica soil that have slopes steeper than 3 percent, soils that have a silty clay loam surface layer, and a few small areas of Sharkey soils that have a subsoil that is strongly acid in the upper part. The included soils areas make up about 15 percent of the map unit.

Most soils in this map unit are used for cultivated crops, mainly soybeans. In a few areas, the soils are used as woodland, pasture, or homesites.

This map unit is somewhat poorly suited to most cultivated crops. Short, choppy slopes, wetness, and poor tilth are the main limitations. Runoff is medium and the hazard of erosion is moderate. Soybeans, grain sorghum, and small grains are the main suitable crops. These soils are sticky when wet, hard when dry, and form clods if tilled when they are too wet or too dry. Irregular slopes hinder tillage operations. A drainage system is needed for most cultivated crops and pasture plants. Land grading and smoothing improve surface drainage, but in places, large volumes of soil need to be moved. Crop residue left on or near the surface helps to conserve moisture, maintain tilth, and control erosion. Most crops and pasture plants respond well to fertilizer. Lime generally is not needed.

This map unit is well suited to eastern cottonwood, American sycamore, and sweetgum. Production potential is high. The main concern in producing and harvesting timber is wetness. The clayey surface layer limits the use of equipment during wet periods. Conventional methods of harvesting timber can be used except sometimes during rainy periods, generally from December to April.

This unit is moderately well suited to pasture. The main limitations are wetness and very slow permeability. Common bermudagrass, improved bermudagrass, tall fescue, dallisgrass, ryegrass, white clover, and small grains are the main suitable pasture plants. Shallow ditches can remove excess surface water. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Nitrogen fertilizer is needed for optimum forage production. Lime generally is not needed.

This map unit is poorly suited to urban uses. It has severe limitations for building sites, local roads and streets, and most sanitary facilities. The main limitations are wetness, flooding, very slow permeability, very high shrink-swell potential, and low strength as it applies to local roads and streets. If buildings are constructed in areas of this map unit, Tunica soil is more suitable for this use. Excess water can be removed by using shallow ditches and providing the proper grade. Septic tank absorption fields do not function properly during rainy periods because of wetness and very slow permeability. Sewage lagoons are needed if these soils are used as homesites. The effects of shrinking and swelling can be minimized by proper design and by backfilling with material that has low shrink-swell potential.

This complex is in capability subclass IIIw and in woodland group 2w.

Ty—Tunica-Sharkey complex, gently undulating, occasionally flooded. These poorly drained soils are in low positions on natural levees of the Mississippi River. They are subject to occasional flooding. The landscape consists of low, parallel ridges and swales. The ridges are 1 foot to 3 feet high and about 120 to 350 feet wide. The swales are about 50 to 300 feet wide. Tunica soil is on convex ridges, and Sharkey soil is in the swales between the ridges. Slopes range from less than 1 percent on ridgetops and in swales to about 3 percent on the side slopes of ridges.

Areas range from 50 to 800 acres and contain 45 percent Tunica soils and about 40 percent Sharkey soils. The components of this complex were so intricately intermingled that it was not practical to map them separately.

This complex is subject to long periods of flooding mainly late in winter, in spring, and early in summer. Flooding occurs about 3 times during each 15 year period during the crop growing season and more often at other times of the year. Floodwater typically is 2 to 5 feet deep, but the depth exceeds 8 feet in places.

Typically, the Tunica soil has a surface layer of dark grayish brown, slightly acid clay about 6 inches thick. The subsoil is dark gray and dark grayish brown, slightly acid clay. The underlying material to a depth of about 60 inches is dark grayish brown and grayish brown, slightly acid silt loam and very fine sandy loam.

The Tunica soil has high fertility. Water and air move through the upper part of this soil very slowly and through the lower part at a moderately slow rate. Water runs off the surface at a medium rate. Adequate water is available to plants in most years. A seasonal high water table is about 1.5 to 3 feet below the surface from January through April. This soil has very high shrink-swell potential.

Typically, the Sharkey soil has a surface layer of dark grayish brown, medium acid clay about 9 inches thick. The subsoil is dark gray and gray, slightly acid or neutral clay. The underlying material to a depth of about 65 inches is gray, mildly alkaline silty clay.

The Sharkey soil has high fertility. Water and air move through this soil very slowly. Water runs off the surface very slowly and ponds in low places for long periods after heavy rains. Adequate water is available to plants in most years. A seasonal high water table fluctuates between a depth of about 2 feet and the soil surface from December through April. This soil has very high shrink-swell potential.

Included in mapping are a few small areas of Commerce, Fausse, and Newellton soils. The Commerce soils are in higher positions on some ridges and are loamy throughout. The very poorly drained Fausse soils are in the lowest positions of some swales and they remain wet most of the year. The Newellton soils are in slightly higher positions on some ridges and have loamy material within 20 inches of the surface. Also included are a few small areas of the Tunica and Sharkey soils that rarely flood, Tunica soils that have a silt loam or silty clay loam surface layer, and a few small areas of Sharkey soils that have a subsoil that is strongly acid the upper part. The included soils make up about 15 percent of the map unit.

Most soils in this map unit are used for cultivated crops, mainly soybeans. In a few areas, the soils are used as woodland or pasture.

This map unit is poorly suited to most cultivated crops. Wetness, poor tilth, and short, choppy slopes are the main limitations. Flooding is a hazard. Runoff is medium and the hazard of erosion is moderate. Soybeans and grain sorghum are the main suitable crops. These soils are sticky when wet, hard when dry, and form clods if tilled when they are too wet or too dry. Levees, channels, and pumps can control flooding. Irregular slopes hinder tillage operations. A drainage system is needed for most cultivated crops and pasture plants. Land grading and smoothing improve surface drainage, but in places, large volumes of soil need to be moved. Crop residue left on or near the surface helps to conserve moisture, maintain tilth, and control erosion. Most crops and pasture plants respond well to fertilizer. Lime generally is not needed.

This map unit is well suited to eastern cottonwood, American sycamore, and sweetgum. The main concerns in producing and harvesting timber are flooding and wetness. The clayey surface layer limits the use of equipment during wet periods. Conventional methods of harvesting timber can be used except sometimes during rainy periods, generally from December to April.

This map unit is somewhat poorly suited to pasture. Wetness is the main limitation. Flooding is a hazard. Common bermudagrass is the main suitable pasture plant. Shallow ditches can remove excess surface water. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Nitrogen fertilizer is needed for optimum forage production.

This map unit is poorly suited to most urban uses. It is not suitable for building sites. The main limitations are wetness, very slow permeability, and very high shrink-swell potential. Flooding is a hazard. Major flood control structures and extensive local drainage systems are needed to protect this map unit from flooding. Septic tank absorption fields do not function properly during rainy periods because of wetness and very slow permeability. Sewage lagoons are needed if these soils are used as homesites. Levees should be of sufficient height to prevent floodwaters from entering the lagoon. The effects of shrinking and swelling can be minimized by proper design and by backfilling with material that has low shrink-swell potential.

The soils of this complex are in capability subclass IVw and in woodland group 2w.

Prime Farmland

In this section, prime farmland is defined and discussed, and the prime farmland soils in Concordia Parish are listed.

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the nation's short- and long-range needs for food and fiber. The acreage of high-quality farmland is limited, and the U.S. Department of Agriculture recognizes that government at local, state, and federal levels, as well as individuals, must encourage and facilitate the wise use of our nation's prime farmland.

Prime farmland soils, as defined by the U.S. Department of Agriculture, are soils that are best suited to producing food, feed, forage, fiber, and oilseed crops. Such soils have properties that are favorable for the economic production of sustained high yields of crops. The soils need only to be treated and managed using acceptable farming methods. The moisture supply, of course, must be adequate, and the growing season has to be sufficiently long. Prime farmland soils produce the highest yields with minimal inputs of energy and economic resources. Farming these soils results in the least damage to the environment.

Prime farmland soils may presently be in use as cropland, pasture, or woodland, or they may be in other uses. They either are used for producing food or fiber or are available for these uses. Urban or built-up land, public land, and water areas cannot be considered prime farmland. Urban or built-up land is any contiguous unit of land 10 acres or more in size that is used for such purposes as housing, industrial, and commercial sites, sites for institutions or public buildings, small parks, golf courses, cemeteries, railroad yards, airports, sanitary landfills, sewage treatment plants, and water control structures. Public land is land not available for farming in national forests, national parks, military reservations, and state parks.

Prime farmland soils usually get an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The acidity or alkalinity level of the soils is acceptable. The soils have few or no rocks and are permeable to water and air. They are not excessively erodible or saturated with water for long periods and are not subject to frequent flooding during the growing season. The slope ranges mainly from 0 to 6 percent. For more detailed information on the criteria, consult the local staff of the Soil Conservation Service.

About 224,000 acres, or nearly 47 percent, of Concordia Parish meets the soil requirements for prime farmland. This prime farmland is mainly on the higher land along the Black, Tensas, and Mississippi Rivers. About 182,000 acres is in crops. These crops, mainly soybeans, wheat, rice, grain sorghum, and cotton, account for an estimated 85 percent of the parish's total agricultural income each year.

Concordia Parish is primarily rural with no large population center, therefore, it has not lost much of its prime farmland to industrial or urban uses. In recent years, spurred on by the increasing demand for soybeans, large acreages of land only marginally suited to cultivation have been cleared or converted from pasture and placed in cultivation. These marginal lands generally are more difficult to cultivate, or are subject to more frequent flooding than lands designated as prime farmland.

The following map units, or soils, make up prime farmland in Concordia Parish. The location of each map unit is shown on the detailed soil maps at the back of this publication. The extent of each unit is given in table 5. The soil qualities that affect use and management are described in the section "Detailed Soil Map Units." This list does not constitute a recommendation for a particular land use.

Soils that have limitations, such as a high water table or flooding, may qualify as prime farmland if these limitations are overcome by such measures as drainage or flood control. In the following list, the measures needed to overcome the limitations of a map unit, if any, are shown in parentheses after the map unit name. Onsite evaluation is necessary to determine if the limitations have been overcome by the corrective measures.

The following map units meet the soil requirements for prime farmland except where the use is urban or built-up land:

Aa	Alligator clay
Ba	Baldwin silty clay loam
Bn	Bruin silt loam
Br	Bruin silt loam, gently undulating
Bu	Bruin silt loam, occasionally flooded
Bw	Bruin-Tunica complex, gently undulating
Ca	Commerce silt loam

Cb	Commerce silt loam, gently undulating
Cc	Commerce silt loam, occasionally flooded
Cm	Commerce silty clay loam
Co	Commerce silty clay loam, occasionally flooded
Dd	Dundee loam
De	Dundee silty clay loam
Dh	Dundee-Alligator-Tensas complex, gently undulating
Ds	Dundee-Alligator-Tensas complex, undulating
Ne	Newellton clay
Nw	Norwood silt loam, gently undulating, occasionally flooded
Sa	Sharkey silt loam
Sh	Sharkey clay
Tc	Tensas silty clay
To	Tensas-Alligator complex, undulating
Ts	Tunica clay
Tu	Tunica-Sharkey complex, gently undulating

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis for predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern that is in harmony with nature.

Contractors can use this survey to locate sources of roadfill, and topsoil. They can use it to identify areas where wetness or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

About 288,000 acres of the approximately 304,000 acres of cleared land in Concordia Parish was used for crops and pasture in 1982. About 280,000 acres was used for row crops, mainly soybeans and about 8,000 acres was used for pasture and hay production. Other crops, grown along or in rotation with soybeans, are wheat, cotton, rice, grain sorghum, oats, and corn. The cropland acreage is increasing as bottom land hardwood forests are drained and cleared and pastures are converted to cropland.

Differences in crop suitability and management needs result from differences in soil characteristics, such as fertility levels, erodibility, organic matter content, availability of water for plants, drainage, and flooding hazard. Cropping systems and soil tillage are also an important part of management. Each farm has a unique soil pattern; therefore, each has unique management problems. Some principles of farm management, however, apply to specific soils and certain crops. This section presents the general principles of management that can be applied widely to the soils of Concordia Parish.

Pasture and Hayland. About 8,000 acres were used for pasture and hayland in Concordia Parish in 1982 (fig. 8). This was a marked decrease compared to the 72,748 acres reported in the U.S. Census of Agriculture in 1969. This decrease was a result of the conversion of pasture to soybean production.

Perennial grasses or legumes, or mixtures of these, are grown for pasture and hay. The mixtures generally consist of either a summer or a winter grass and a suitable legume. In addition, many cattle producers seed ryegrass or small grain in the fall for winter and spring forage. Excess grass in summer is harvested as hay for the winter.

Common and improved bermudagrass and dallisgrass are the summer perennials most commonly grown. Improved bermudagrass produces good quality forage if grown on loamy soils. Improved bermudagrass is difficult to establish on poorly drained, clayey soils. Tall fescue, the chief winter perennial grass, grows well only on soils

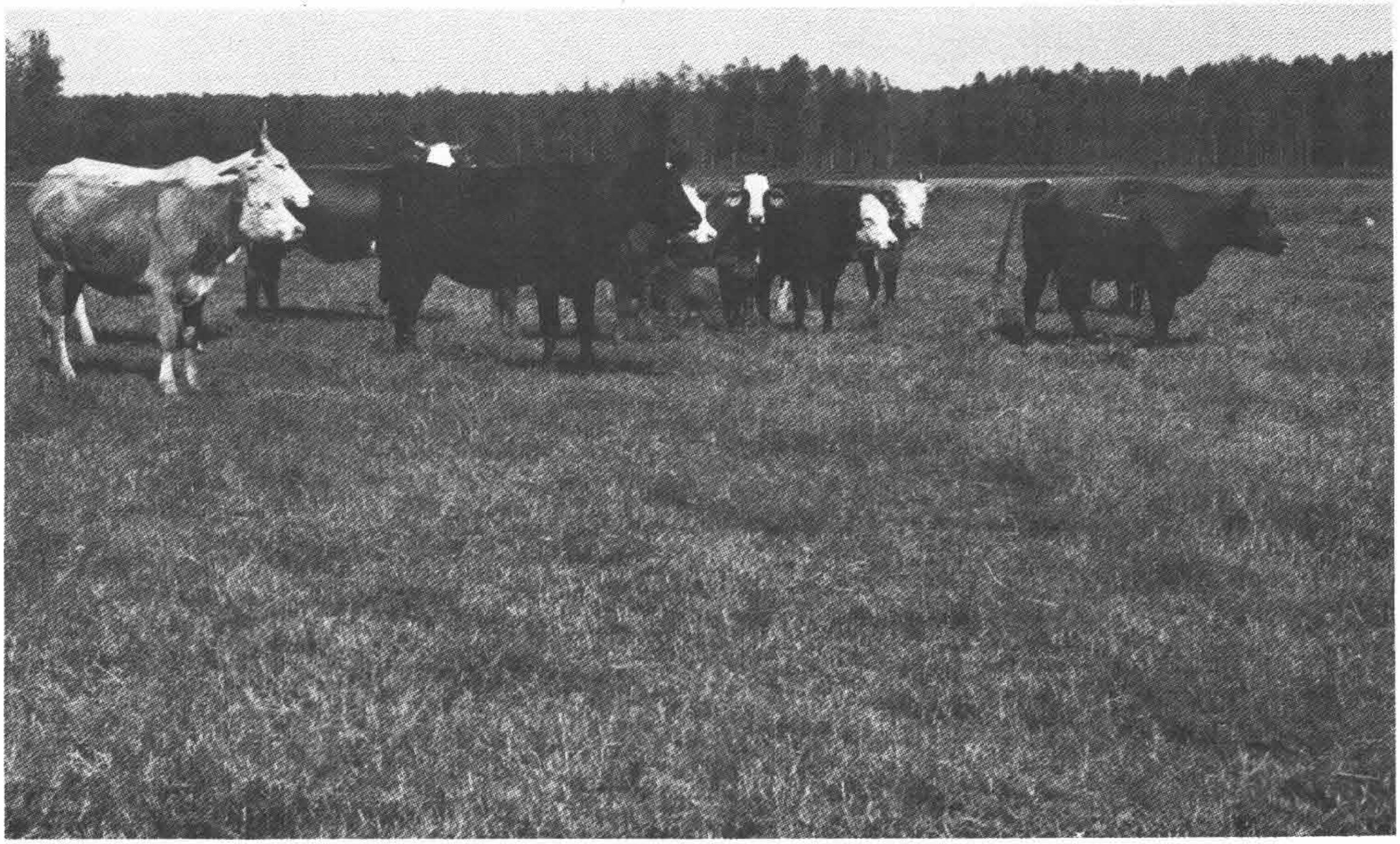


Figure 8.—Native and domestic grasses on these Commerce and Bruin soils, frequently flooded, provide food for cattle.

that have a favorable moisture content. All of these grasses respond well to fertilizers, particularly nitrogen.

White clover and vetch are the most commonly grown legumes. These legumes respond well to lime, particularly if they are grown on acid soils.

Proper grazing is essential for high quality forage and stand survival. Brush and weed control, fertilizer, lime, and renovation of the pasture are also important.

Many cattle producers obtain additional forage by letting cattle graze the understory native plants in woodland. Forage volume varies with the woodland site, the condition of the native forage, and the density of the timer stand. Although most woodland is managed mainly for timber production or wildlife habitat, substantial volumes of forage can be obtained from areas under good management. Stocking rates and grazing periods need to be carefully managed to obtain optimum forage production and to prevent damage to the woodland resource.

Fertilization and Liming. The soils of the parish range from strongly acid to mildly alkaline in the surface layer. Soils on older landforms along the Black and Tensas Rivers such as the Dundee, Baldwin, Tensas, and Alligator soils generally are strongly acid, and they have medium fertility. These soils need lime and a complete fertilizer for nonleguminous crops and pasture plants. The Bruin, Commerce, Norwood, Tunica, and Sharkey soils formed in recent sediments along the Mississippi and Red Rivers, and they generally have slightly acid to mildly alkaline surface layers and high fertility. These soils generally need only nitrogen fertilizer for nonleguminous crops and pasture plants. Lime generally is not needed.

The amount of fertilizer needed depends on the kind of crop, on past cropping history, on the level of yield desired, and on the kind of soil. Applications should be determined on the basis of soil test results. Information and instructions on collecting and testing soil samples can be obtained from the Cooperative Extension Service.

Organic Matter Content. Organic matter is an important source of nitrogen for crop growth. It also increases the rate of water intake, reduces surface crusting, reduces soil erosion, and improves tilth. Soils that are mainly used for crops are low or moderately low in organic matter content. The level of organic matter can be maintained by growing crops that produce an extensive root system and an abundance of foliage, by leaving plant residue on the surface, by growing perennial grasses and legumes in rotation with other crops, and by adding barnyard manure.

Soil Tillage. Soils need only enough tilling to prepare a seedbed and to control weeds because excessive tillage destroys soil structure. The clayey soils in the parish become cloddy if cultivated when they are too wet or too dry. A compacted layer, generally known as a plowpan or traffic pan, sometimes develops just below the plow layer in loamy soils. This can be avoided by not plowing when the soil is wet or by varying the depth of plowing, or the compacted layer can be broken up by subsoiling or chiseling. Some tillage implements merely stir the surface, thereby leaving crop residue in place to protect the soil from beating rains. This helps control erosion, reduce runoff, increase infiltration, and reduce surface crusting.

Drainage and Flood Control. Most soils in the parish need surface drainage to make them more suitable for crops. The soils in high positions on natural levees are drained by a gravity drainage system consisting of row drains and field drains. The clayey soils in low positions on the flood plain are drained by a gravity drainage system consisting of a series of mains and laterals or smaller drains that branch out from them. The success of the systems depends upon the availability of adequate outlets. Another method used to improve drainage is land grading, or precisely leveling the fields to a uniform grade. Land grading improves surface drainage, eliminates cross ditches, and makes longer rows possible.

The Tensas-Concordia ring levee protects about 80 percent of the parish from flooding by the rivers surrounding the parish; however, many acres are not protected from backwater flooding or flooding by runoff from higher areas. Levees and pumps are needed to drain floodwater from many of the soils that are at low elevations.

Water for Plant Growth. The available water-holding capacity of most soils in the parish is moderate to high. In some years, however, sufficient water is not available at the critical time for optimum plant growth unless the soils are irrigated. Large amounts of rain generally fall in winter and in spring, and rainfall is adequate for plant growth in summer and in fall of most years. However, plants often lack moisture on some soils during dry periods in summer and in fall. This rainfall pattern favors the growth of early-maturing crops.

Cropping System. A good cropping system includes a legume for nitrogen, a cultivated crop to aid in weed control, a deep-rooted crop to utilize substratum fertility, and a close-growing crop to help maintain organic matter content. The sequence of crops should keep the soil covered as much of the year as possible.

A suitable cropping system varies according to the needs of the farmer and the characteristics of the soil. Producers of livestock, for example, generally use cropping systems that have a higher percentage of pasture than farmers growing cash crops.

In Concordia Parish, soybeans are grown continuously or they are grown in rotation with cotton, rice, or grain sorghum. Grass or legume cover crops are commonly grown during the fall and winter. Double-cropping of wheat and soybeans is becoming more common in some places. About 25,000 acres of wheat was harvested in 1982.

Control of Erosion. Soil erosion generally is not a serious problem on the level and nearly level soils in Concordia Parish. It is, however, a problem on the more sloping soils and in fallow-plowed fields. Gullies commonly form in newly constructed drainage ditches and at overfalls into drainage ditches.

If the surface layer of the soil is lost through erosion, most of the available plant nutrients and most of the organic matter are also lost. Soil erosion also results in sedimentation of drainage systems and pollution of streams by sediment, nutrients, and pesticides.

Sheet and rill erosion can be reduced by minimum tillage or conservation tillage and by maintaining a plant cover on the soil for extended periods. New drainage ditches should be seeded immediately after construction. Water control structures in drainageways drop water to different levels and can help prevent gullying.

Additional information on erosion control, cropping systems, and drainage practices can be obtained from the local office of the Soil Conservation Service and the Cooperative Extension Service or from the Louisiana Agricultural Experiment Station.

Yields Per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby parishes and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that insures the smallest possible loss.

For yields of irrigated crops, it is assumed that the irrigation system is adapted to the soils and to the crops grown, that good quality irrigation water is uniformly applied as needed, and that tillage is kept to a minimum.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for use as cropland. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major, and generally expensive, landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey. These levels are defined in the following paragraphs.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode, but they have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless a close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c,* used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

There are no subclasses in class I because the soils of this class have few limitations. The soils in class V are subject to little or no erosion, but they have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation. Class V contains only the subclasses indicated by *w, s,* or *c.*

The acreage of soils in each capability class and subclass is shown in table 7. The capability classification of each map unit is given in the section "Detailed Soil Map Units."

Woodland Management and Productivity

Carl V. Thompson, Jr., State Staff Forester, Soil Conservation Service, helped prepare this section.

Hardwood forests once covered most of Concordia Parish; however, clearing the trees for cropland began soon after the early settlers arrived. The loamy soils on high positions on natural levees were best suited to cropland and were cleared first. Soybeans, which grow well on a wide variety of soils, became a commonly grown crop in the parish and the clearing of bottom land hardwood accelerated. Today, the forested area is rapidly decreasing as many more acres are cleared for cultivation.

About 32 percent of the land in Concordia Parish, or 147,500 acres, was woodland in 1982. This is about 149,500 acres less than in 1967. About 64 percent of the woodland in the parish is privately or corporately owned, and the remaining 36 percent is in state- or federally-owned wildlife management areas *(31).*

The woodland in the parish consists of bottom land hardwood forests, the largest areas of which, are in general soil map units 5 and 6, described in the section "General Soil Map Units." The dominant forest type in map unit 5 is the sugarberry-American elm-green ash type, with smaller areas of willow and cottonwood forest types. General soil map unit 6 supports the overcup oak-water hickory forest type with smaller areas of the baldcypress-water tupelo forest type. Commercially important areas of sweetgum-Nuttall oak-willow oak forest type are in general soil map units 3 and 7. Significant areas of the sugarberry-American elm-green ash forest type are also in general soil map units 4 and 7.

The importance of timber production to the economy of Concordia Parish has lessened in recent years because the supply of quality timber has been significantly depleted. As timber was harvested, the land was not adequately reforested. The potential value of wood products in Concordia Parish is still substantial; however, under present management much of the existing woodland is producing far below its potential. Most of the commercial woodland would benefit if stands were improved by thinning out mature and undesirable trees. Tree planting, protection from grazing and fire, and control of insects and disease are also needed to improve stands. The local offices of the Soil Conservation Service and Louisiana State Forestry Commission and the Cooperative Extension Service can help determine specific woodland management needs.

Table 8 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination symbol (woodland suitability) for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *w* indicates excessive water in or on the soil; and *s*, sandy texture. The letter *o* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is w, and then s.

In table 8, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or in equipment; and *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree to which the soil affects the mortality of tree seedlings. Plant competition is not considered in the ratings. The ratings apply to seedlings from good stock that are properly planted during a period of sufficient rainfall. A rating of *slight* indicates that the expected mortality is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Ratings of *plant competition* indicate the degree to which undesirable plants are expected to invade where there are openings in the tree canopy. The invading plants compete with native plants or planted seedlings. A rating of *slight* indicates little or no competition from other plants; *moderate* indicates that plant competition is expected to hinder the development of a fully stocked stand of desirable trees; *severe* indicates that plant competition is expected to prevent the establishment of a desirable stand unless the site is intensively prepared, weeded, or otherwise managed to control undesirable plants.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

Trees to plant are those that are suited to the soils and to commercial wood production.

Recreation

Concordia Parish has many areas of scenic and historic interest. These areas are used for camping, hunting, fishing, bird watching, sightseeing, picnicking, and boating. Public areas available for recreation include Lake St. John, Lake Concordia, Cocodrie Lake, and the Concordia, Red River, and Three Rivers Wildlife Management Areas.

The soils in the parish best suited to development of intensively used areas, such as playgrounds or ballfields, are in general soil map units 1 and 2, described in the section "General Soil Map Units." Soils in unit 3 through 8 are generally poorly suited for these uses.

In table 9, the soils of the survey area are rated according to the limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 9, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 9 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 12 and interpretations for dwellings without basements and for local roads and streets in table 11.

Camp areas require site preparation such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have gentle slopes and are not wet or subject to flooding during the period of use. The surface absorbs rainfall readily but remains firm, and is not dusty when dry.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is firm after rains, and is not dusty when dry.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Billy R. Craft, State Staff Biologist, Soil Conservation Service, helped prepare this section.

Concordia Parish has a large and varied population of fish and wildlife. Habitat types include open agricultural land, bottom land hardwood forests, wetlands, shallow lakes, and deep rivers, each supporting populations of game and nongame fish and wildlife.

Areas of cropland and pasture provide food and cover for mourning dove, bobwhite quail, swamp and cottontail rabbits, red fox, coyote, and many types of songbirds and nongame animals. Temporarily inundated fields provide food and resting areas for large concentrations of migrating waterfowl.

Approximately 147,500 acres of bottom land hardwood forest in Concordia Parish represents some of the best woodland wildlife habitat in the state (fig. 9). About 53,000 acres of this woodland is in state-owned wildlife management areas. Most of the remaining woodland is leased to hunting clubs. White-tailed deer, gray squirrel, fox squirrel, swamp rabbit, mink, raccoon, bobcat, coyote, wild turkey, and many types of birds, reptiles, and amphibians inhabit the hardwood forest. Numerous small lakes, bayous, and wetlands provide feeding and resting areas for large populations of herons, ibis, egrets, wood duck, and migrating waterfowl. Endangered or threatened species, such as the bald eagle, peregrine, and southern panther also find food and cover in the bottom land hardwood areas.

Concordia Parish is nearly surrounded by rivers and has several large natural lakes within its boundaries. These waters, along with miles of smaller bayous, water-filled borrow pits, and small lakes, support large populations of game fish, such as largemouth bass, white bass, striped bass, white and black crappie, warmouth, and sunfish. Commercial catfish, buffalo, gaspergou, garfish, and paddlefish are caught in large numbers each year. A small, but increasing acreage of ponds is used for the commercial production of crawfish. The potential is good for the expansion of the crawfish industry.

Many areas in the parish can be improved for wildlife by increasing the supply of suitable food, water, and cover. Lack of cover in the cropland areas in fall and in winter is the primary limiting factor for small game production. Areas that are best suited for improvement are units 3, 4, 6, 7, and 8 described in the section "General Soil Map Units."

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 10, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining

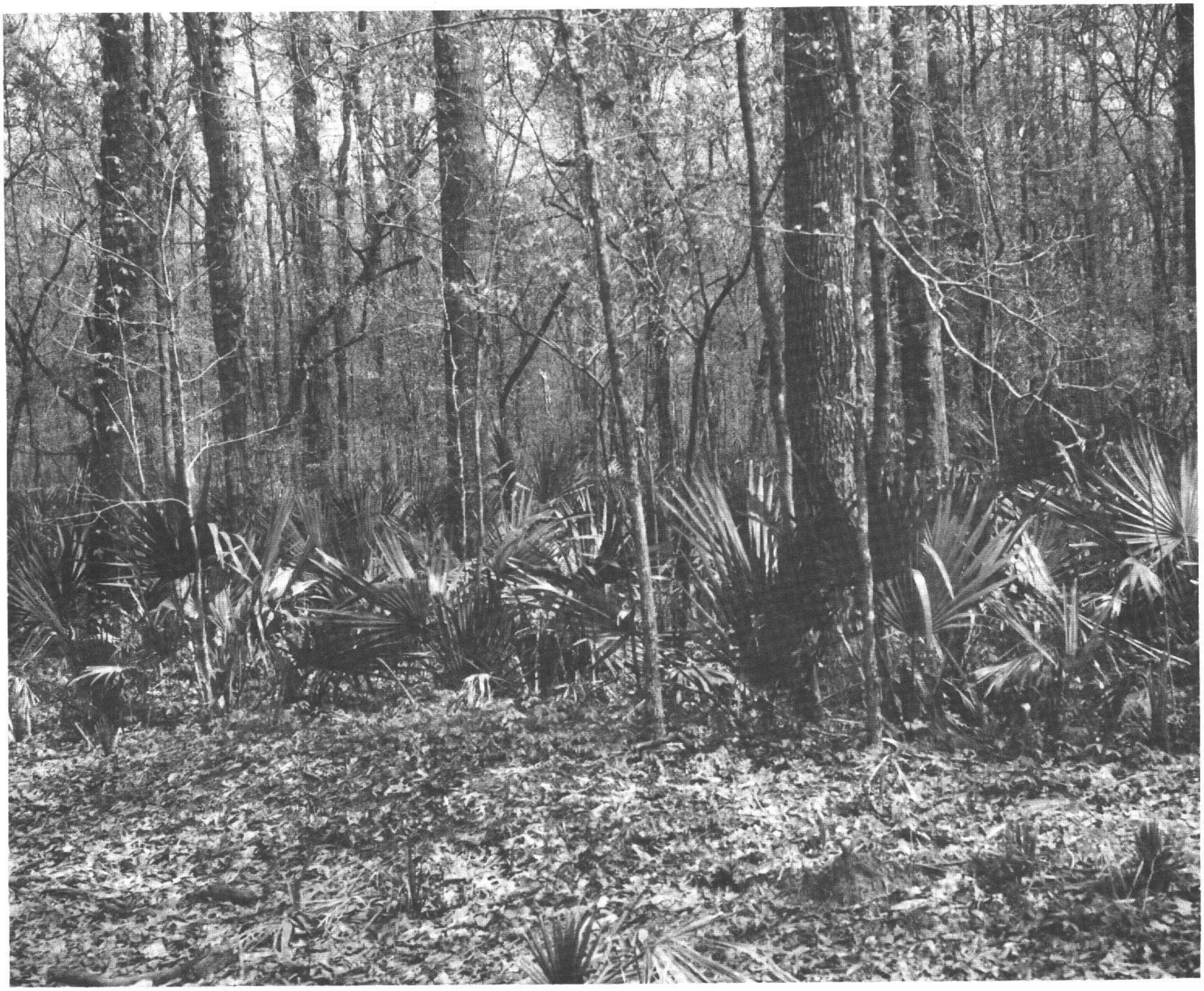


Figure 9.—This area of bottom land hardwoods provides excellent habitat for many species of wildlife. The soil is Alligator clay.

the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and rice.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, bahiagrass, bermudagrass, clover, and vetch.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are partridgepea, goldenrod, beggarweed, paspalum, and wooly croton.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are oak, sugarberry, pecan, sweetgum, hawthorn, dogwood, blackberry, and greenbriar. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are persimmon, redbay, and mayhaw.

Shrubs are bushy woody plants that produce fruit, buds, twigs, bark, and foliage. Soil properties and features that affect the growth of shrubs are depth of the root zone, available water capacity, salinity, and soil moisture. Examples of shrubs are American beautyberry, American elder, and deciduous holly.

Wetland plants are annual and perennial, wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, and slope. Examples of wetland plants are smartweed, wild millet, wildrice, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are wetness, slope, and permeability. Examples of shallow water areas are marshes, swamps, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include bobwhite quail, mourning dove, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon and deer.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet, and because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations must be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to: evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of earthfill and topsoil; plan drainage systems, irrigation systems, ponds, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 11 shows the degree and kind of soil limitations that affect shallow excavations, dwellings without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by a very firm dense layer, soil texture, and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 12 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 12 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and that good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, and flooding affect absorption of the effluent.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel is less than 4 feet below the base of the absorption field or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 12 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, flooding, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 12 are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, slope, and flooding affect both types of landfill. Texture, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture and wetness affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 13 gives information about the soils as a source of roadfill and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by a high water table. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand. They have at least 5 feet of suitable material, low shrink-swell potential, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10 or a high shrink-swell potential. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope and a water table.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and releases a variety of plant-available nutrients as it decomposes.

Water Management

Table 14 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives the restrictive features that affect each soil for drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material. A high water table affects the amount of usable material and trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; and susceptibility to flooding. Excavating and grading and the stability of ditchbanks are affected by slope and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The performance of a system is affected by depth of the root zone and soil reaction.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Wetness and slope affect the construction of grassed waterways. Low available water capacity, restricted rooting depth, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 15 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system *(4)* and the system adopted by the American Association of State Highway and Transportation Officials *(3)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area, or from nearby areas, and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 16 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate, or component, consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They influence the soil's absorption of cations, moisture retention, shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3 bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage in each major soil layer is stated in inches of water per inch of soil. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion. Losses are expressed in tons per acre per year *(34)*. These estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur over a sustained period without affecting crop productivity. The rate is expressed in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition.

In table 16, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter of a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 17 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary covering of the soil surface by flowing water, is caused by overflowing streams or by runoff from adjacent slopes. Shallow water standing or flowing for short periods after rainfall is not considered flooding. Standing water in swamps and marshes or in a closed depression is considered ponding.

Table 17 gives the frequency and duration of flooding and the time of year when flooding is most likely to occur.

Frequency, duration, and probable dates of occurrence are estimated. Frequency generally is expressed as *none, rare, occasional,* or *frequent*. *None* means that flooding is not probable. *Rare* means that flooding is unlikely but possible under unusual weather conditions (there is a near 0 to 5 percent chance of flooding in any year). *Occasional* means that flooding occurs infrequently under normal weather conditions (no more than twice in 5 years). *Frequent* means that flooding occurs often under normal weather conditions (more than twice in 5 years). Duration is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 days to 1 month), and *very long* (more than 1 month). The time of year that floods are most likely to occur is expressed in months. December-June, for example, means that flooding can occur during the period December through June. About two-thirds to three-fourths of all flooding occurs during the stated period. To determine the frequency of flooding for any period during the year, see the map unit descriptions in the section "Detailed Map Units."

The definitions of the frequency of flooding for the occasional and frequently flooded phases differ from the National Soil Conservation Service definition of flooding found elsewhere, in that the frequency of flooding for each of these phases are slightly different.

The information on flooding is based on evidence in the soil profile, namely, thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons, which are characteristic of soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 17 are the depth to the seasonal high water table; the kind of water table, that is, *perched, artesian*, or *apparent;* and the months of the year that the water table commonly is highest. A water table that is seasonally high for less than 1 month is not indicated in table 17.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. An *artesian* water table is under hydrostatic head, generally below an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

The two numbers in the "High water table-Depth" column indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. "More than 6.0" indicates that the water table is below a depth of 6 feet or that the water table exists for less than a month.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severely corrosive environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and the amount of sulfates in the saturation extract.

Soil Fertility Levels

Dr. Bobby J. Miller, Department of Agronomy, Agricultural Experiment Station, Louisiana State University, helped prepare this section.

Soil fertility commonly refers to the available nutrients in the soil working with other chemical conditions to influence growth of plants. It is one of the major factors determining a soil's potential for crop production. The natural fertility level reflects the soil's inherent capacity to supply the nutrients plants require and to provide a favorable chemical environment for plant roots. Plant nutrient deficiencies, as well as excessive quantities of some elements, limit crop yields on some soils in Concordia Parish.

Evaluation of the soil's fertility is based on results of soil tests or plant tissue analyses that indicate the quantities of available plant nutrient elements. Special consideration is also given to other soil chemical characteristics that might have a detrimental effect on plant growth. During the survey, for many of the soils mapped, each horizon was sampled to a depth of at least 60 inches. Some of the analyses made of the samples were soil reaction, the content of organic matter, extractable phosphorus, exchangeable calcium, magnesium, potassium, sodium, aluminum, hydrogen, and extractable acidity, cation exchange capacity, and base saturation. The results of these analyses, given in tables 18 and 20, are the basis for the discussion in this section. These results can be especially useful in developing soil fertility programs, in determining effects of natural soil fertility levels on yield potentials of crops, and in evaluating possible effects of management practices that result in material from subsurface horizons being incorporated into the surface horizon. Such practices include ditching, terracing, land leveling, and levee construction.

With few exceptions, soil fertility management and other soil management programs in the area are based on chemical and physical alteration of the surface horizon or plow layer. Characteristics of this horizon may be extremely variable from one place to another depending on past management practices and soil use. However, in this section emphasis is placed on characteristics of horizons below the plow layer. Subsurface horizons are less subject to change, or change very slowly, as a result of alteration of the plow layer. Fertility levels and other chemical characteristics of the surface horizon are irrelevant as limiting factors in plant growth under management systems that include adequate soil testing and fertility maintenance programs. Under these conditions, physical characteristics of the plow layer and physical and chemical characteristics of horizons below the plow layer are the soil factors that may limit plant growth. Thus, subsurface horizons can, and frequently do, limit crop yields that can be obtained through normal crop management practices.

Organic matter is an important factor in soil productivity. Organic matter in mineral soils increases water holding and cation exchange capacities and increases development and stability of soil structure which, in turn, increases rates of water infiltration and improves soil aeration. The organic matter content in mineral soils is typically greater in the surface horizon than in the subsurface horizon. The content of organic matter in the surface horizon of a particular kind of soil can vary widely because of differences in use and management. The content of organic matter decreases overall with depth in all the soils sampled. Slight irregularities in depths below the surface horizon can be related to individual strata in the parent material. Of the soils sampled, only the Crevasse, Dundee, Newellton, and Sharkey soils contained less than 1 percent organic matter in the surface horizon. The content of organic matter was between 1 and 2 percent in the surface horizon of the Baldwin, Commerce, Fausse, Norwood, and Tensas soils. The Alligator, Bruin, Latanier, and Tunica soils contained between 2 and 3 percent organic matter in the surface horizon.

The actual quantity of a nutrient element present as well as the relative quantity of other elements present are important considerations in evaluating a soil's fertility. The soil's cation exchange capacity is a measure of its ability to absorb positively charged ions such as calcium, magnesium, potassium, sodium, aluminum, hydrogen, and other elements. Thus, larger quantities of an element such as calcium are required to give a high exchangeable calcium saturation if the cation exchange capacity of a soil is high. Louisiana Agricultural Experiment Station publications *(7, 19, 20, 22)* contain additional information about soil fertility.

Soil cation exchange capacity is almost entirely a result of the amount and kind of clay and organic matter present. All of the soils mapped in Concordia Parish developed in alluvial deposits that contain depositional strata that differ in amounts of sand, silt, and clay. The Alligator, Sharkey, and Fausse soils contain large amounts of clay throughout and have high cation exchange capacities. The Latanier, Newellton, and Tunica soils developed in areas where clayey deposits overlie less clayey sediments at depths between 12 and 40 inches. Consequently, these soils have higher cation exchange capacities in the upper horizons than in the lower horizons. In contrast, the Crevasse soils developed in sandy deposits that contain small amounts of clay and have low cation exchange capacities. The Bruin, Commerce, Norwood, and Tensas soils developed in mostly loamy strata and have cation exchange capacities intermediate between soils developed in the more clayey deposits and those developed in the more sandy deposits. The Baldwin and Dundee soils developed in loamy sediments and have subsoil horizons that are more clayey than surface horizons. As a result, they frequently have a greater cation exchange capacity in the subsoil than in surface horizons. The cation exchange capacity in the Dundee soil, for example, is 10.8 milliequivalents per 100 grams of soil in the surface layer and 15.6 milliequivalents per 100 grams of soil in the next underlying horizon in the subsoil.

A soil with a cation exchange complex that is 85 to 100 percent saturated with bases (calcium, magnesium, potassium, and sodium) is the most desirable condition for most agricultural purposes. A number of the soils in the parish have base saturations this high in some or all subsurface horizons within the depths analyzed.

The relative amounts of the different bases present can be equally important. In general 60 to 80 percent saturation with calcium, 10 to 20 percent saturation with magnesium, 2 to 5 percent saturation with potassium, and less than 2 percent saturation with sodium are considered favorable for most uses. Excessive quantities of a particular element, especially sodium, can be detrimental.

The percent base saturation is greater than 50 in all horizons of the thirteen representative soils analyzed. Only five of the soils, Alligator, Baldwin, Bruin, Dundee, and Tensas contained horizons with less than 70 percent base saturation. In these five soils, percent base saturations were greater than 70 in some but not all horizons. An overall increase in percent base saturation as depth increases is evident in the Alligator, Baldwin, Bruin, Fausse, Newellton, Sharkey, and Tunica soils. Only the Crevasse soil analyzed had a regular decrease in percent base saturation with increasing depth. Although profile distribution trends were somewhat irregular in the remaining soils, percent base saturations were generally higher in lower horizons compared to horizons near the surface. Major factors considered responsible for the base saturation trends described are: weathering and leaching, which tends to result in base saturations that increase with depth; additions of fertilizer and possibly agricultural lime along with the biocycling of plant nutrients, which tends to maintain or increase base saturations in surface horizons; and variations in soil texture and mineralogy associated with depositional strata, which results in differences in amounts of bases and the soil's capacity to retain them.

The amounts and percent saturation of subsurface horizons with exchangeable calcium, magnesium, and potassium place all the soils in the medium or high bracket with respect to soil fertility.

The data in Tables 18 and 20 include the amounts of exchangeable sodium measured in the representative soils sampled. The percent saturation with exchangeable sodium is less than 5 in all horizons of all the soils. Less than 2.5 milliequivalents of exchangeable sodium were measured in all horizons from all the soils. These amounts and percent saturation with exchangeable sodium are not great enough to be considered a detrimental factor in plant growth. Potentially toxic levels of exchangeable sodium have not been reported in any of the soil series mapped in Concordia Parish.

The data in Tables 18 and 20 contain a measure of soil acidity. Soil pH is an expression of the intensity factor in soil acidity. Most agricultural crops grow best on soils having pH values in the range 6.0 to 7.0. Soil pH values lower than 5.5 or higher than 7.5 are less desirable because of reduced availability of some plant nutrient elements and the potential for toxicity from certain other elements. Only the Alligator, Dundee, and Tensas soils analyzed contain horizons with pH values lower than 5.5. Soil pH values higher than 7.5 were measured in some horizons from the Bruin, Commerce, Latanier, Newellton, Norwood, and Tunica soils.

The sum of the exchangeable aluminum plus hydrogen is the exchangeable acidity in the particular soil horizon at the pH measured for that horizon. This sum is a measure of the unaltered soil's exchangeable acidity and reflects the condition of the soil as it exists in the field. The sum of exchangeable aluminum and hydrogen is less than 1.0 milliequivalents per 100 grams of soil in all horizons of all but the Alligator, Dundee, and Tensas soils. The amounts present in these soils are relatively low with no more than 2.9 milliequivalents per 100 grams of soil in any horizon.

The extractable acidity is a measure of the soil acidity at pH 8.2. It is a measure of the total acidity that would need to be neutralized in order to raise the soil to pH 8.2. This measurement of acidity includes that measured as exchangeable aluminum and hydrogen plus a pH-dependent component of acidity. A measure of pH dependent acidity can be made by subtracting the exchangeable aluminum and hydrogen from the extractable acidity. For example, the Bt2 horizon (15 to 27 inches) in the Dundee soil contains 10.1

milliequivalents per 100 grams of soil extractable acidity of which 0.5 milliequivalents per 100 grams is exchangeable hydrogen, 2.4 milliequivalents per 100 grams is exchangeable aluminum and 7.2 milliequivalents per 100 grams is pH dependent acidity. The amount of pH dependent acidity at pH values other than 8.2 cannot be determined from the data in Table 18.

Quantities of exchangeable aluminum that are potentially toxic to some plants are present in some horizons of mineral soils having pH values of less than about 5.5. High levels of exchangeable aluminum can be toxic to many cultivars of crops such as cotton, soybeans, corn, and small grains *(1, 2, 5, 6, 10, 11, 12, 14, 15, 17, 18, 21, 23, 24)*. A greater than 10 percent saturation of the soil's effective cation exchange capacity with exchangeable aluminum may result in aluminum toxicity to some crops. The effective cation exchange capacity of the soil is the sum of the exchangeable calcium, magnesium, potassium, sodium, aluminum, and hydrogen.

The Alligator, Dundee, and Tensas were the only soils analyzed that contained measurable quantities of exchangeable aluminum in any horizon. The amounts present and percent saturation were very low throughout the depth sampled in the Alligator and Tensas soils. Even crops sensitive to aluminum toxicity would likely not be affected by the low levels of aluminum in these two soils. The Dundee soil analyzed lacked measurable quantities of exchangeable aluminum in the surface horizon. However, the amounts present in subsurface horizons were sufficient to give as much as 23 percent saturation with exchangeable aluminum. Levels this high may inhibit root development and thus reduce yields of some cultivars of crops such as cotton and soybeans.

The complex relationships between exchangeable aluminum and other soil properties indicate that actual measurement of exchangeable aluminum present is the only reliable indicator of aluminum levels in acid mineral soils having soil pH 5.5 or less *(19, 20)*. Potentially toxic levels of exchangeable aluminum have not been found in soils having higher pH values.

Soil treatments or other cultural methods that reduce or avoid problems associated with high levels of exchangeable aluminum have not been throughly studied in Louisiana. Liming soil horizons to above 5.5 is probably the most widespread method of reducing exchangeable aluminum levels *(1, 2, 6, 14, 15, 17, 18, 21, 24)*. There is a wide range of susceptibility to aluminum phytotoxicity among many agronomic crops depending, in some cases, on the particular cultivar grown. Planting crops or cultivars that are tolerant of high aluminum levels can help avoid phytotoxicity problems.

Manganese is an essential plant nutrient element that may be present in amounts that are toxic to plants in acid, poorly drained soils. The data reported in Tables 18 and 20 do not include manganese levels in the soils. Manganese is somewhat analogous to aluminum in that potentially toxic levels are most common in soil horizons that have a pH 5.0 to 5.5 or less. Increasing the pH of the soil to pH 6.0 or more reduces manganese solubility to nontoxic levels. Unlike aluminum, manganese can occur either as the oxidized or reduced form in soils. The more soluble reduced form of manganese is more prevalent in wet, poorly or somewhat poorly drained soils than in associated soils that are better drained. Also, potentially toxic levels in a surface horizon are more common for manganese than aluminum. Toxicity from high levels of manganese is more common in wet than in dry years. There are no known reports of either manganese toxicity or deficiencies in plants grown in Concordia Parish or at other locations on soils in any of the soil series mapped in Concordia Parish.

The Latanier and Norwood soils have calcium carbonate in horizons below a depth of not more than 20 inches. In some locations calcium carbonate is present in all horizons in these soils. Depending on the location, calcium carbonate may or may not be present in one or more horizons at a depth of more than 20 inches in the Baldwin, Sharkey, and Tunica soils. The presence of calcium carbonate is an important factor in use and management of soils. It is a very readily weatherable source of calcium and neutralizer of acidity.

Large quantities of calcium carbonate in the upper, especially the surface horizon, can be an undesirable condition for plant growth for several reasons. The alkaline soil reaction maintained by excess calcium carbonate can seriously depress availability of some essential plant nutrients, especially micronutrients such as zinc, copper, and manganese; large quantities of phosphorus may be precipitated as compounds such as tricalcium phosphates; excessive amounts of calcium carbonate may, upon weathering, give rise to cation exchange reactions that result in the soils exchange complex being essentially 100 percent calcium saturated and almost devoid of other cations such as magnesium and potassium.

The soils analyzed in Concordia Parish can be placed in three general groups with respect to levels of extractable phosphorus in horizons below the surface. The Commerce soil with more than 250 parts per million extractable phosphorus in all horizons comprises one group. A second group includes Bruin, Crevasse, Fausse, Latanier, Newellton, and Norwood soils with extractable phosphorus levels of 50 parts per million or more in all subsurface horizons. A third group consists of the Alligator, Baldwin, Dundee, Sharkey, Tensas, and Tunica soils which contain less than 50 parts per million extractable phosphorus in one or more subsurface horizons. Extractable phosphorus levels are generally less in soils, such as Dundee, Alligator, and Tensas, developed in sediments associated with the older meander belts of the Mississippi River, than in soils developed in the younger meander belt sediments. Extractable phosphorus levels may differ widely between individual strata in the initial parent material of all the soils.

The following are the methods used by the Soil Fertility Laboratory of the Louisiana Agricultural Experiment Station. The codes in parentheses refer to published methods *(30)*.

Organic matter—dichromate, ferric sulfate titration (6A1a).

Exchangeable cations—ammonium acetate pH 7.0, uncorrected; calcium (6N2), magnesium (6O2), sodium (6P2), potassium (6Q2).

Extractable acidity—barium chloride-triethanolamine 1 pH 8.2 (6H1a).

Cation-exchange capacity—sum of cations (5A3a).

Base saturation—sum of cations, TEA, pH 8.2 (5C3).

Reaction (pH)—1:1 water dilution (8C1a).

Aluminum—potassium chloride extraction (6G).

Extractable phosphorus—(Bray 2 extractant (0.03 Molar ammonium flouride-0.1) Molar hydrochloric acid.)

Percent aluminum saturation calculated by dividing the exchangeable aluminum by the effective cation exchange capacity where effective cation exchange capacity is the sum of ammonium acetate exchangeable Ca, Mg, K, and Na plus 1 Normal Potassium Chloride exchangeable aluminum and hydrogen.

Percent exchangeable sodium saturation is calculated by dividing the exchangeable sodium by the cation exchange capacity (sum).

Physical and Chemical Analyses of Selected Soils

The results of physical analysis of several typical pedons in the survey area are given in table 19 and the results of chemical analysis in table 20. The mineral composition of the very fine sand, silt, and clay of these pedons are given in table 21. The data are for soils sampled at carefully selected sites. The pedons are typical of the series and are described in the section "Soil Series and Their Morphology." Soil samples were analyzed by the Soil Characterization Laboratory, Louisiana Agricultural Experiment Station.

Most determinations, except those for grain-size analysis and bulk density, were made on soil material smaller than 2 millimeters in diameter. Measurements reported as percent or quantity of unit weight were calculated on an oven-dry basis. The methods used in obtaining the data are indicated in the list that follows. The codes in parentheses refer to published methods *(30)*.

Sand—(0.05-2.0 mm fraction) weight percentages of materials less than 2 mm (3A1).

Silt—(0.002-0.05 mm fraction) pipette extraction, weight percentages of all materials less than 2 mm (3A1).

Clay—(fraction less than 0.002 mm) pipette extraction, weight percentages of materials less than 2 mm (3A1).

Water retained—pressure extraction, percentage of oven-dry weight of less than 2 mm material; 1/3 or 1/10 (3/10) bar (4B1), 15 bars (4B2).

Water-retention difference—between 1/3 bar and 15 bars for less than 2 mm material (4C1).

Field moist bulk density—of less than 2 mm material, saran-coated clods (4A3A). Ovendry bulk density (4A1h).

Linear extensibility—change in clod dimension based on less than 2 mm material (4D).

Organic matter—dichromate, ferric sulfate titration (6A1a).

Total nitrogen—Kjeldahl (6B1b).

Extractable cations—ammonium acetate pH 7.0, uncorrected; calcium (6N2), magnesium (602), sodium (6P2), potassium (6Q2).

Extractable acidity—barium chloride-triethanolamine II (6H2b).

Cation-exchange capacity—ammonium acetate, pH 7.0 (5A1a).

Base saturation—ammonium acetate, pH 7.0 (5C1).

Reaction (pH)—1:1 water dilution (8C1a).

Reaction (pH)—calcium chloride (8C1e).

Aluminum—potassium chloride extraction (6G).

Iron—dithionate-citrate extract (6C2b).

Available phosphorus—(Bray No. 1).

Interpretation of Laboratory Data

Bobby J. Miller, Department of Agronomy, Agricultural Experiment Station, Louisiana State University

Tables 19, 20, and 21 summarize the results of physical, chemical, and mineralogical analyses on each horizon of representative pedons of the four soils (Commerce, Dundee, Sharkey, and Tensas) selected for characterization in Concordia Parish. The four soils analyzed did not contain particles that had greater than 2.0 millimeter effective diameter. The analyses reported in tables 19, 20, and 21 were performed in the Soil Characterization and Soils Laboratories, Agronomy Department, Agricultural Experiment Station, Louisiana State University Agricultural Center.

The data from these four representative soils illustrate important features of each soil and important differences among the soils. These differences can mostly be attributed to differences in the soil's content of sand, silt, and clay and differences in time of soil development. The Commerce and Sharkey soils developed in alluvium associated with the present, and therefore youngest, Mississippi River meander belt. They are considered to be less than about 3,000 years old *(26)*. The Dundee and Tensas soils developed in alluvium associated with an older meander belt and are believed to be between 3,000 and 5,000 years old. The higher soil pH and higher percent base saturation of the soils developed in the youngest sediments is illustrated by the Commerce and Sharkey soil data which show pH values of 5.8 or greater throughout and percent base saturation by summation of cations of greater than 75 throughout. By comparison, percent base saturations determined by the same method are less than 75 and soil pH values are for the most part, less than 5.9 throughout the Dundee and Tensas soils. The plow layer of the Dundee soil has a pH of 6.3, which presumably is the result of a recent addition of lime to the soil. In both the Dundee and Tensas soils, the percent base saturation and soil pH generally increase with depth. Calculations of the percent saturation with exchangeable calcium, magnesium, and potassium show higher saturations in the Commerce and Sharkey than in the Dundee and Tensas soils. The more highly weathered and acid nature of the Dundee and Tensas soils is also demonstrated by the presence of significant amounts of exchangeable aluminum and hydrogen. Measurable quantities of exchangeable aluminum were not present in either the Commerce or Sharkey soil and only very small amounts of exchangeable hydrogen were present in the Sharkey soil. Some subhorizons within the Dundee and Tensas soils have exchangeable aluminum levels high enough to be potentially toxic to plants that are very susceptible to aluminum toxicity.

The cation exchange capacities of the soils depend almost entirely on the amount and kind of clay present together with organic matter content. Cation exchange capacities and clay content of the surface horizons of the four soils decrease in the order Sharkey, Tensas, Commerce, and Dundee. Cation exchange capacities in subsurface horizons follow the same order except that Commerce and Dundee have very similar cation exchange capacities that vary somewhat with clay content.

The results of mineralogical analyses of the soils are reported in Table 21. The clay-size fraction of all the soils consists of approximately 75 percent smectite. Micaceous clays and kaolinite each comprise about 10 percent of the clay-size fraction. The remainder consists of small amounts of quartz, feldspars and interlayered and interstratified phyllosilicates. The very-fine sand and silt-size fractions from all the soils are comprised mostly of quartz and small amounts of other minerals resistant to weathering. Feldspars are the predominant weatherable minerals present and both plagioclas and alkali group feldspars were identified. The remaining weatherable minerals consist mostly of pyroxines, amphiboles, and small amounts of mica.

Moisture retention data for the Commerce, Dundee, Sharkey, and Tensas soils are reported in Table 19. Soil moisture retention is typically related to texture, structure, and organic matter content. Total water storage capacity measured at 1/3 bar in the upper 60 inches of soil decreases in the order Sharkey, Tensas, Commerce, and Dundee. Available water storage capacity in this same zone, and taken as 1/3 bar water content minus 15 bar water content, decreases in the order Sharkey, Commerce, Tensas, and Dundee. The available water storage capacity obtained on this Sharkey soil is somewhat higher than is normally expected for soils in the Sharkey series. Some Sharkey soils may have available water storage capacities of approximately one-half that of the pedon reported in Table 19. In contrast, the Dundee soil is normally expected to have available water storage capacities approximately one-third greater than those reported in Table 19 for the Dundee soil.

The bulk densities of both the Commerce and Dundee soils are appreciably higher in the horizon immediately below the plow layer than in the plow layer itself. At even greater depths, the bulk density values are again lower. These relationships hold for field moist, air dry, and oven dry bulk densities. The higher bulk densities in the horizon below the plow layer in these loamy soils is attributed to compaction by machinery and equipment during tillage operations. Similar effects are not apparent in the bulk densities of the more clayey Sharkey soils. The highest oven dry bulk density value in the Tensas soil is in the first horizon below the plow layer. However, the effect is not so apparent in the field moist bulk density of the Tensas soil. Shrinking and swelling of the large quantities of expanding-lattice clays in soils, such as Sharkey and Tensas, tends to overcome the effects of compaction caused by farming operations. The high shrinkage capacity of these clays also can explain the high density values obtained on individual clods or aggregates of these soils compared to soils such as commerce and Dundee with much lower total clay content.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(32)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or on laboratory measurements. Table 22 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Inceptisol.

SUBORDER. Each order is divided into suborders, primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquept (*Aqu*, meaning water, plus *ept*, from Inceptisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Haplaquepts (*Hapl*, meaning minimal horizonation, plus *aquept*, the suborder of the Inceptisols that has an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Vertic* identifies the subgroup that shrinks and swells and cracks more than is typical of soils in the great group. An example is Vertic Haplaquepts.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is very-fine, montmorillonitic, nonacid, thermic Vertic Haplaquepts.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. There can be some variation in the texture of the surface layer or of the substratum within a series. Soils in the Sharkey series are classified as very-fine, montmorillonitic, nonacid, thermic, Vertic Haplaquepts.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the *Soil Survey Manual (29)*. Many of the technical terms used in the descriptions are defined in *Soil Taxonomy (32)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Alligator Series

The Alligator series consists of poorly drained, very slowly permeable soils that formed in clayey alluvium. These soils are in low positions on natural levees along former channels of the Mississippi River and its distributaries. A seasonal high water table is within 0.5 foot to 2 feet of the surface from January through April in most years. Slopes range from 0 to 3 percent.

The soils of the Alligator series are very-fine, montmorillonitic, acid, thermic Vertic Haplaquepts.

The Alligator soils are similar to the Fausse, Sharkey, and Sostien soils and commonly are near the Baldwin, Dundee, and Tensas soils. The Baldwin and Tensas soils are in slightly higher positions than Alligator soils. Baldwin soils have an argillic horizon. The Tensas soils are loamy in the lower part of the subsoil and in the underlying material. The Dundee soils are in higher positions than the Alligator soils and they are fine-silty. The Fausse soils are in lower positions and do not crack to a depth of 20 inches in most years. The Sharkey soils formed in younger sediment than the Alligator soils and are less acid in the subsoil. The Sostien soils are in disturbed areas and are forming in clayey fill material.

Typial pedon of Alligator clay; 3.5 miles southwest of Ferriday, 1.1 miles south on Louisiana Highway 15 from its junction with U.S. Highway 84, 3.2 miles southwest on parish road to Bayou Cocodrie, 0.3 mile northwest on a field road, 100 feet east of the field road, SW1/4NE1/4 sec. 13, T. 7 N., R. 8 E.

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) clay; weak medium granular and weak medium subangular blocky structure; firm, sticky and plastic; common fine and very fine roots; medium acid; abrupt smooth boundary.

Bg1—5 to 11 inches; gray (10YR 5/1) clay; many fine distinct brown (7.5YR 4/4) mottles and common fine prominent strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky and moderate medium angular blocky structure; very firm, plastic; few fine nonintersecting slickensides; common fine and very fine roots; some material from Ap horizon in cracks; very strongly acid; clear smooth boundary.

Bt2—11 to 23 inches; dark gray (5Y 4/1) clay; many fine and medium distinct brown (7.5YR 4/4) mottles; common fine prominent strong brown (7.5YR 5/6) mottles; moderate fine and medium angular blocky structure; very firm, very plastic; common medium nonintersecting slickensides; few fine and very fine roots; some material from Ap horizon in cracks, common fine soft masses of dark brown (10YR 3/3) material; strongly acid; gradual smooth boundary.

Bg3—23 to 40 inches; gray (5YR 5/1) clay; many fine and medium prominent strong brown (7.5YR 5/6) mottles; common fine distinct brown (7.5YR 4/4) and yellowish brown (10YR 5/6) mottles; moderate fine and medium angular blocky structure; very firm, very plastic; common medium nonintersecting slickensides; few fine and very fine roots; dark gray (10YR 4/1) coatings in old root channels; some material from Ap horizon in cracks in upper part; few fine soft masses of dark brown (10YR 3/3) material; strongly acid; gradual smooth boundary.

Cg—40 to 65 inches; gray (5Y 5/1) clay; many fine distinct dark yellowish brown (10YR 4/4) mottles; few fine distinct yellowish brown (10YR 5/6) mottles; massive; very firm, very plastic; common medium slickensides; common fine soft masses of dark brown (10YR 3/3) material; slightly acid.

The thickness of the solum ranges from 40 to 60 inches. When dry, these Alligator soils develop cracks that are 1 to 3 centimeters wide and extend to a depth of 20 inches or more. Except where lime has been added, reaction in the upper 40 inches is strongly acid or very strongly acid.

The A horizon has hue of 10YR or 5Y, value of 4 to 6, and chroma of 1 or 2. It is 4 to 10 inches thick. The texture is clay or silty clay loam.

The Bg horizon has hue of 10YR or 5Y, value of 4 to 7, and chroma of 1; or it has hue of 10YR, 2.5Y, or 5Y, value of 6 or 7, and chroma of 2. Texture is clay or silty clay.

The Cg horizon has colors similar to those of the Bg horizon. The Cg horizon is silty clay loam, silty clay, or clay, and it is slightly acid or neutral.

Baldwin Series

The Baldwin series consists of poorly drained, very slowly permeable soils that formed in clayey alluvium. These soils are in intermediate and low positions on natural levees along former channels of the Mississippi River and its distributaries. A seasonal high water table is within 2 feet of the surface from December through April in most years. Slope is less than 1 percent.

The soils of the Baldwin series are fine, montmorillonitic, thermic Vertic Ochraqualfs.

The Baldwin soils commonly are near the Alligator and Dundee soils and are similar to the Tensas soils. The Alligator soils, in lower positions than Baldwin soils, do not have an argillic horizon and they have a very-fine textured control section. The Dundee soils are in slightly higher positions and they are fine-silty. The Tensas soils formed in younger sediment than Baldwin soils and they are more acid in the lower part of the subsoil.

Typical pedon of Baldwin silty clay loam; 0.6 mile south of Frogmore on field road to railroad tracks, 0.2 mile south on field road, 35 feet west of center of field road, SW1/4NW1/4 sec. 9, T. 7 N., R. 8 E.

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silty clay loam; weak fine subangular blocky structure; friable; common fine and very fine roots; medium acid; clear smooth boundary.

Btg1—7 to 17 inches; dark gray (10YR 4/1) silty clay; common fine distinct olive brown (2.5Y 4/4) mottles and few fine distinct yellowish brown (10YR 5/6) mottles; strong medium subangular blocky structure; very firm; common fine and very fine roots; continuous thin very dark gray (10YR 3/1) coatings on surface of peds; few fine soft masses of black material; medium acid; clear smooth boundary.

Btg2—17 to 28 inches; dark gray (10YR 5/1) silty clay; many fine distinct light olive brown (2.5Y 5/6) mottles and common fine distinct olive brown (2.5Y 4/4) mottles; moderate medium subangular blocky structure; very firm; few fine roots; continuous thin very dark gray (10YR 3/1) coatings on surface of peds; few fine soft masses of black material; slightly acid; clear smooth boundary.

BCg1—28 to 34 inches; olive gray (5Y 5/2) silty clay loam; many fine and medium distinct light olive brown (2.5Y 5/6, 5/4) mottles and common fine distinct yellowish (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; few very fine roots; discontinuous thin dark gray (10YR 4/1) coatings on surfaces of some peds; common fine soft masses of black material; neutral; clear smooth boundary.

BCg2—34 to 44 inches; dark gray (5Y 4/1) silty clay; many fine distinct olive brown (2.5Y 4/4) mottles and few fine distinct light olive brown (2.5Y 5/6) mottles; moderate medium subangular blocky structure; very firm; few thin patchy clay films on surface of some peds; many fine and very fine soft masses of black material; few fine and very fine soft masses of white material; neutral; clear smooth boundary.

Cg1—44 to 60 inches; olive gray (5Y 5/2) silty clay; many fine and medium distinct light olive brown (2.5Y 5/6, 5/4) mottles and common fine distinct olive brown (2.5Y 4/4) mottles; weak coarse subangular blocky structure; very firm; many fine and very fine soft masses of black material; few very fine soft masses of white material; mildly alkaline; clear smooth boundary.

Cg2—60 to 71 inches; olive gray (5Y 4/2) silty clay loam; many fine and medium distinct light olive brown (2.5Y 5/6, 5/4) mottles and common medium faint dark gray (5Y 4/1) mottles; weak coarse subangular blocky structure; firm; common fine and very fine soft masses of black material; mildly alkaline.

The thickness of the solum ranges from 40 to 70 inches. When dry, these soils crack to a depth of 20 inches or more.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 1 or 2. It is 6 to 10 inches thick and ranges from very strongly acid to slightly acid.

The Btg and BCg horizons typically have hue of 10YR or 5Y, value of 4 to 6, and chroma of 1 or 2. In some pedons these horizons have hue of 2.5Y, value of 6, and chroma of 2. Texture is clay, silty clay, or silty clay loam. Reaction is medium acid or slightly acid in the Btg horizon and ranges from medium acid to moderately alkaline in the BCg horizon.

The Cg or 2Cg horizon has the same range in colors as those of the Btg and BCg horizons. Texture is clay, silty clay, silty clay loam, silt loam, loam, or very fine sandy loam. Reaction ranges from neutral to moderately alkaline.

Bruin Series

The Bruin series consists of moderately well drained, moderately permeable soils that formed in loamy alluvium. These soils are in the highest positions on natural levees of the Mississippi River. Slopes range from 0 to 3 percent.

The soils of the Bruin series are coarse-silty, mixed, thermic Fluvaquentic Eutrochrepts.

The Bruin soils are similar to the Cocodrie, Commerce, and Crevasse soils and commonly are near the Newellton, Sharkey, and Tunica soils. The Cocodrie soils are in disturbed areas and are forming in loamy fill material. The Commerce soils are somewhat poorly drained. They are in slightly lower positions than Bruin soils and are fine-silty. Crevasse soils are excessively drained. They are adjacent to the Mississippi River and are sandy throughout. The Newellton, Sharkey, and Tunica soils are generally in lower positions than the Bruin soils and they have a more clayey subsoil.

Typical pedon of Bruin silt loam; 0.5 mile north of Vidalia, in soybean field 0.2 mile west of curve in field road, 91 feet north of center of field road, Spanish Land Grant sec. 11, T. 7 N., R. 10 E.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; very friable; many fine and very fine roots; slightly acid; abrupt smooth boundary.

Bw1—7 to 15 inches; dark brown (10YR 4/3) silt loam; few fine faint yellowish brown and grayish brown mottles; weak medium subangular blocky structure; very friable; common fine and very fine roots; mildly alkaline; clear smooth boundary.

Bw2—15 to 22 inches; brown (10YR 5/3) very fine sandy loam; common fine faint grayish brown mottles and few fine distinct dark yellowish brown (10YR 4/6) mottles; weak coarse subangular blocky structure; very friable; common fine and very fine roots; mildly alkaline; gradual smooth boundary.

BC—22 to 31 inches; brown (10YR 5/3) very fine sandy loam; many fine faint grayish brown mottles and few fine distinct dark yellowish brown (10YR 4/6) mottles; weak coarse subangular blocky structure; very friable; neutral; gradual smooth boundary.

C1—31 to 42 inches; grayish brown (10YR 5/2) very fine sandy loam; common fine faint dark yellowish brown and strong brown mottles; massive; very friable; thin distinct bedding planes; few thin strata of silt loam; neutral; clear smooth boundary.

C2—42 to 51 inches; grayish brown (10YR 5/2) very fine sandy loam; few fine distinct gray (10YR 6/1) mottles and common fine faint dark brown mottles; massive; very friable; thin distinct bedding planes; few dark stains and soft black masses; neutral.

C3—51 to 65 inches; dark brown (10YR 4/3) very fine sandy loam; common fine distinct yellowish brown (10YR 5/6) and common fine faint grayish brown mottles; massive; very friable; thin distinct bedding planes; thin strata of grayish brown silt loam; slightly acid.

The thickness of the solum ranges from 18 to 40 inches.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. Texture is silt loam or very fine sandy loam. The Ap horizon is 4 to 14 inches thick and ranges from medium acid to mildly alkaline.

The Bw and BC horizons have hue of 10YR, value of 4 or 5, and chroma of 3 or 4. Mottles of chroma 1 or 2 are within a depth of 24 inches. Texture is very fine sandy loam or silt loam. Reaction ranges from slightly acid to mildly alkaline.

The C horizon has hue of 10YR, value of 4 or 5, and chroma of 1, 2, or 3. Texture is very fine sandy loam, silt loam, or silty clay loam. Reaction ranges from slightly acid to moderately alkaline.

Cocodrie Series

The Cocodrie series consists of moderately well drained, moderately permeable soils that formed in loamy sediment dredged and pumped from canals or rivers or from land surfaces during construction of waterways. Slopes range from 0 to 2 percent.

The soils of the Cocodrie series are coarse-silty, mixed, nonacid, thermic Aquic Udifluvents.

The Cocodrie soils are similar to the Bruin and Commerce soils, and commonly are near the Crevasse and Sostien soils. The Bruin and Commerce soils are in adjacent undisturbed areas. Bruin soils have developed a subsoil horizon. Commerce soils are somewhat poorly drained and are fine-silty. Crevasse soils are excessively drained and Sostien soils poorly drained. The Sostien soils are in similar positions as the Cocodrie soils. The Crevasse soils are sandy throughout and the Sostien soils are clayey throughout.

Typical pedon of Cocodrie very fine sandy loam; in an area of Sostien-Cocodrie association, occasionally flooded, 5.5 miles west of the Old River Control Structure, Three Rivers Wildlife Management Area, 3.9 miles west from levee on shell road, 0.3 mile south on road, 110 feet east of road, unsectionized area, T. 1 N., R. 8 E.

A—0 to 3 inches; dark grayish brown (10YR 4/2) very fine sandy loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak medium granular structure; very friable; many fine and very fine roots; 1/2-inch thick layer of very dark grayish brown (10YR 3/2) very fine sandy loam at surface; mildly alkaline; clear smooth boundary.

C—3 to 65 inches; brown (10YR 5/3) very fine sandy loam; fine and medium distinct gray (10YR 5/1) mottles that are few in the upper part and common in the lower part and common fine and medium faint yellowish brown (10YR 5/6) mottles; massive; thinly bedded throughout; very friable; many fine and medium roots, common coarse roots; common thin strata and clods of grayish brown (10YR 5/2) silt loam and loamy fine sand; moderately alkaline.

Reaction ranges from slightly acid to moderately alkaline throughout.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. It is 2 to 8 inches thick.

The C horizon has hue of 10YR, value of 4 or 5, and chroma of 3 to 6. Some pedons have chroma of 2 in the lower part. The C horizon is silt loam or very fine sandy loam. Thin strata or clods of coarser or finer textured material or coarser and finer textured material range from few to common. Buried soils are below a depth of 40 inches in some pedons.

Commerce Series

The Commerce series consists of somewhat poorly drained, moderately slowly permeable soils that formed in loamy alluvium. These soils are on natural levees of the Mississippi River. A seasonal high water table is at a depth of 1.5 to 4 feet below the surface from December to April in most years. Slopes range from 0 to 3 percent.

The soils of the Commerce series are fine-silty, mixed, nonacid, thermic Aeric Fluvaquents.

The Commerce soils are similar to the Bruin, Cocodrie, and Dundee soils, and commonly are near the Newellton, Sharkey, and Tunica soils. The Bruin soils are in slightly higher positions than Commerce soils, and they are coarse-silty. The Cocodrie soils are in disturbed areas and are forming in loamy fill material. The Dundee soils formed in older sediment than the Commerce soils, and they have an argillic horizon. The Newellton, Sharkey, and Tunica soils are generally in lower positions than Commerce soils and have a clayey subsoil.

Typical pedon of Commerce silt loam; 1 mile south of Shaw, 0.8 mile south of the junction of Louisiana Highway 910 and Louisiana Highway 15, on Louisiana Highway 15, 0.1 mile west along fence line to field drain, 0.3 mile south of fence line, 66 feet west of drain, Spanish Land Grant sec. 24, T. 2 N., R. 8 E.

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) silt loam; moderate fine granular structure; very friable;

many fine and very fine roots; many fine wormcasts; neutral; clear smooth boundary.

B—5 to 12 inches; grayish brown (10YR 5/2) silt loam; many fine distinct dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/6) mottles and few fine distinct brown (7.5YR 4/4) mottles; weak medium subangular blocky structure; very friable; many fine and very fine roots; thin stratum of dark gray (10YR 4/1) silty clay loam in upper part; mildly alkaline; clear smooth boundary.

BC—12 to 20 inches; grayish brown (10YR 5/2) silt loam; many fine distinct brown (7.5YR 4/4) and dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; very friable; common fine and very fine roots; few fine soft dark brown (10YR 3/3) masses; few dark grayish brown (10YR 4/2) coatings on some peds; thin stratum of dark gray (10YR 4/1) silty clay loam; moderately alkaline; gradual smooth boundary.

C1—20 to 28 inches; grayish brown (10YR 5/2) silt loam; many fine distinct dark yellowish brown (10YR 4/4) mottles and few fine distinct brown (7.5YR 4/4) mottles; weak coarse subangular blocky structure; very friable; common fine and very fine roots; few fine soft dark brown (10YR 3/3) masses; few thin strata of very fine sandy loam and silt; finely banded, faint color striations throughout; moderately alkaline; gradual smooth boundary.

C2—28 to 38 inches; dark grayish brown (10YR 4/2) silty clay loam; many fine and medium distinct brown (7.5YR 4/4) and dark yellowish brown (10YR 4/4) mottles; weak coarse subangular blocky structure; friable; few fine and very fine roots; thin stratum of dark gray (10YR 4/1) silty clay; mildly alkaline; clear smooth boundary.

C3—38 to 60 inches; dark grayish brown (10YR 4/2) silt loam; few fine faint dark gray mottles and many fine distinct brown (7.5YR 4/4) mottles; massive; very friable; few fine and very fine roots; few thin strata of silty clay loam; fine banded faint color striations throughout; mildly alkaline.

The thickness of the solum ranges from 20 to 40 inches.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. Texture is silt loam or silty clay loam. The Ap horizon is 5 to 12 inches thick and ranges from medium acid to mildly alkaline.

The B and BC horizons have hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 or 2. Texture is silt loam or silty clay loam. Reaction ranges from slightly acid to moderately alkaline.

The C horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 or 2. Texture is very fine sandy loam, silt loam, silty clay loam, silty clay or clay. Reaction ranges from neutral to moderately alkaline.

Crevasse Series

The Crevasse series consists of excessively drained, rapidly permeable soils that formed in sandy alluvium. These soils are on sandbars and in high positions on natural levees of the Mississippi River. A seasonal high water table is at a depth of 3.5 to 6 feet below the surface during November through March in most years. These soils are subject to frequent flooding. Slopes range from 0 to 5 percent.

The soils of the Crevasse series are mixed, thermic Typic Udipsamments.

The Crevasse soils commonly are near the Bruin, Commerce, Cocodrie, Newellton, and Sostien soils. The Bruin soils, in similar positions as Crevasse soils, are coarse-silty. The Cocodrie and Sostien soils are in disturbed areas. Cocodrie soils are forming in loamy fill materials and Sostien soils are forming in clayey fill materials. The Commerce soils are in slightly lower positions than the Crevasse soils and they are fine-silty. The Newellton soils are in lower positions and have a clayey subsoil.

Typical pedon of Crevasse fine sand, frequently flooded; 3.5 miles northeast of Vidalia, 1,300 feet south of Rifle Point Chute along unimproved road, 300 feet west of road, unsectionized area, T. 8 N., R. 10 E.

A—0 to 5 inches; yellowish brown (10YR 5/4) fine sand; single-grained; loose; many fine and very fine roots; neutral; clear smooth boundary.

C1—5 to 37 inches; brown (10YR 5/3) fine sand; few fine distinct yellowish brown (10YR 5/6) mottles; single grained; loose; many fine and very fine roots; common thin strata of very dark grayish brown organic material at irregular intervals; neutral; gradual smooth boundary.

C2—37 to 65 inches; thinly bedded yellowish brown (10YR 5/6) and light grayish brown (10YR 6/2) fine sand; single-grained; weakly stratified; loose; few thin strata of very dark grayish brown organic material at irregular intervals; neutral.

The A horizon has hue of 10YR, value of 4 to 7, and chroma of 2 to 6. It is 4 to 8 inches thick and ranges from medium acid to moderately alkaline.

The C horizon has hue of 10YR, value of 4 to 6, and chroma of 2 to 6. It is sand, fine sand, loamy fine sand, or loamy sand and ranges from medium acid to moderately alkaline.

The Crevasse soils in map unit ST are taxadjuncts to the Crevasse series, because they have thin strata and pockets of finer textured materials within 40 inches of the surface. This is outside the defined range for the series, but this difference does not affect use and management of these soils.

Dundee Series

The Dundee series consists of somewhat poorly drained, moderately slowly permeable soils that formed in loamy alluvium. These soils are on the older natural levees of the Mississippi River and its distributaries. The Dundee soils have a seasonal high water table at a depth of 1.5 to 3.5 feet below the surface from December to April in most years. Slopes range from 0 to 5 percent.

The soils of the Dundee series are fine-silty, mixed, thermic Aeric Ochraqualfs.

The Dundee soils are similar to the Commerce soils and commonly are near the Alligator, Baldwin, and Tensas soils. The Commerce soils formed in younger sediment than the Dundee soils and do not have an argillic horizon. The poorly drained Alligator soils are in lower positions than Dundee soils and have a very-fine textured control section. The Baldwin and Tensas soils are in slightly lower positions and have a fine textured control section.

Typical pedon of Dundee loam; 7 miles north of Frogmore, 5.7 miles north of Louisiana Highway 566 from U.S. Highway 84, 3 miles east on improved parish road to grain bins, 800 feet southeast on field road, 120 feet east of field road, SE1/4NW1/4 sec. 2, T. 8 N., R. 8 E.

Ap—0 to 7 inches; brown (10YR 4/3) loam; weak fine granular structure in upper part and weak coarse subangular blocky in lower part; very friable; many fine and very fine roots; slightly acid; clear smooth boundary.

Bt1—7 to 15 inches; grayish brown (10YR 5/2) clay loam; many fine distinct strong brown (7.5YR 5/6) mottles and common fine distinct brown (10YR 4/3) mottles; weak coarse subangular blocky structure parting to moderate medium subangular blocky; firm; many fine and very fine roots; thin continuous dark grayish brown clay films on surface of peds and in pores; very strongly acid; gradual smooth boundary.

Bt2—15 to 27 inches; grayish brown (10YR 5/2) loam; common fine distinct strong brown (7.5YR 5/6) and many fine distinct dark yellowish brown (10YR 4/4) mottles; weak coarse prismatic structure parting to moderate fine and medium subangular blocky; friable; common fine and very fine roots; thin nearly continuous dark grayish brown clay films on surface of peds and in pores; very strongly acid; clear smooth boundary.

BC—27 to 37 inches; grayish brown (10YR 5/2) loam; many fine distinct dark yellowish brown (10YR 4/4) mottles and common fine distinct strong brown (7.5YR 5/6) mottles; weak coarse prismatic structure parting to medium subangular blocky; friable; few very fine roots; many very fine pores; few thin patchy clay films on surface of peds and in pores; few fine soft dark brown (10YR 3/3) masses; very strongly acid; gradual smooth boundary.

C1—37 to 48 inches; grayish brown (10YR 5/2) loam; many fine distinct yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure; friable; few very fine roots; many very fine pores; few fine soft dark brown (10YR 3/3) masses; few large discontinuous krotovinas; very strongly acid; gradual smooth boundary.

2C2—48 to 65 inches; grayish brown (10YR 5/2) loam; many fine distinct yellowish brown (10YR 5/6) and common fine distinct dark yellowish brown (10YR 4/4) mottles; massive; friable; few very fine roots; many very fine pores; common fine soft dark brown (10YR 3/3) masses; few large discontinuous krotovinas; strongly acid.

The thickness of the solum ranges from 30 to 60 inches.

The A horizon, which is 4 to 8 inches thick, has hue of 10YR, value of 4 or 5, and chroma of 2 or 3, or it has value of 3, chroma of 2 where the horizon is less than 6 inches thick. Texture is loam or silty clay loam. Reaction ranges from very strongly acid to medium acid, except where lime has been added.

The Bt horizon has hue of 10YR, value of 4 or 5, and chroma of 2. It is loam, clay loam, or silty clay loam and ranges from very strongly acid to medium acid.

The BC horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. It is loam, silt loam, or very fine sandy loam and ranges from very strongly acid to medium acid.

The C or 2C horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. It is loam, silt loam, or very fine sandy loam, and ranges from very strongly acid to neutral.

Fausse Series

The Fausse series consists of very poorly drained, very slowly permeable soils that formed in clayey alluvium. These soils are in old channel scars and depressions of the Mississippi River alluvial plain. Fausse soils are flooded for long periods and have a high water table within 1.5 feet of the surface throughout most years. Slope is generally less than 0.1 percent.

The soils of the Fausse series are very-fine, montmorillonitic, nonacid, thermic Typic Fluvaquents.

The Fausse soils are similar to the Alligator, Sharkey, and Sostien soils and commonly are near the Tensas and Tunica soils. Alligator, Sharkey, and Tunica soils are poorly drained, and Tensas soils are somewhat poorly drained. Alligator, Sharkey, Tunica, and Tensas soils are in slightly higher positions than the Fausse soils. They all crack to a depth of 20 inches in most years. Sostien soils are poorly drained. They are in disturbed areas and are forming in clayey fill material.

Typical pedon of Fausse clay; 1.5 miles west of Shaw, 1,800 feet north of Louisiana Highway 910 along the Red River Wildlife Management Area boundary, 240 feet east of fence line, Spanish Land Grant sec. 16, T. 3 N., R. 8 E.

A—0 to 2 inches; very dark grayish brown (10YR 3/2) mucky clay; many very fine roots and partially decayed leaves and woody material; medium acid; abrupt smooth boundary.

Ag—2 to 12 inches; dark gray (5Y 4/1) clay; common fine distinct brown (10YR 5/3) and dark yellowish brown (10YR 5/6) mottles; few fine faint dark greenish gray mottles; weak coarse subangular blocky structure; very sticky, very plastic; common fine and very fine roots; neutral; clear smooth boundary.

Bg—12 to 38 inches; gray (5Y 5/1) clay; many fine and medium distinct dark yellowish brown (10YR 4/4) mottles, common fine distinct olive brown (2.5Y 4/4) mottles and few medium faint dark greenish gray (5GY 4/1) mottles; weak coarse subangular blocky structure; very sticky, very plastic; slightly acid; gradual smooth boundary.

Cg—38 to 62 inches; gray (5Y 5/1) clay; common fine and medium distinct dark yellowish brown (10YR 4/4) and dark brown (10YR 4/3) mottles and common medium distinct olive (5Y 4/4) mottles; massive; very sticky, very plastic; neutral.

The thickness of the solum ranges from 25 to 50 inches.

The A horizon has hue of 10YR or 5Y, value of 4, and chroma of 1 or 2. It is 4 to 12 inches thick. Where the horizon is less than 10 inches thick, it has value of 3, and chroma of 1 or 2. Reaction ranges from medium acid to neutral.

The Bg horizon has hue of 10YR or 5Y, value of 4 or 5, and chroma of 1, or it is neutral and has value of 4 or 5. Reaction ranges from slightly acid to moderately alkaline.

The Cg horizon has hue of 5Y or 5GY, value of 4 or 5, and chroma of 1, or it is neutral and has value of 4 or 5. Texture is clay, silty clay, or silty clay loam. Reaction ranges from neutral to moderately alkaline.

Latanier Series

The Latanier series consists of somewhat poorly drained, very slowly permeable soils that formed in clayey alluvium underlain by loamy alluvium. These soils are in intermediate positions on the natural levees of the Red River. A seasonal high water table is at a depth of 1 foot to 3 feet below the surface from December through April in most years. Slopes range from 0 to 3 percent.

The soils of the Latanier series are clayey over loamy, mixed, thermic Vertic Hapludolls.

The Latanier soils are similar to the Newellton and Tunica soils, and commonly are near Norwood and Sharkey, overwash, soils. The Newellton and Tunica soils, in similar positions as Latanier soils, are dominantly gray. The Norwood soils, in slightly higher positions, are loamy throughout. The Sharkey, overwash, soils, in lower positions, are clayey throughout.

Typical pedon of Latanier clay; 8.5 miles west of Shaw, 1.1 miles west of Red River Wildlife Management Area camp on levee, 300 feet north of levee in field, 66 feet east-northeast of a utility pole, Spanish Land Grant sec. 13, T. 3 N., R. 7 E.

Ap—0 to 5 inches; dark reddish brown (5YR 3/2) clay; strong fine granular structure; very firm; common fine and very fine roots; common fine fragments of charcoal; mildly alkaline; clear smooth boundary.

Bw1—5 to 14 inches; dark reddish brown (5YR 3/3) clay; moderate medium subangular blocky structure; very firm; few fine and very fine roots; few fine black stains on surfaces of peds; mildly alkaline; gradual smooth boundary.

Bw2—14 to 24 inches; dark reddish brown (5YR 3/4) silty clay; common fine faint gray mottles; moderate medium subangular blocky structure; very firm; few fine and very fine roots; few fine black stains on surfaces of peds; mildly alkaline; abrupt wavy boundary.

2C1—24 to 32 inches; brown (7.5YR 4/4) silty clay loam; common medium faint dark brown (7.5YR 4/2) mottles; weak medium subangular blocky structure; friable; thin strong brown (7.5YR 5/6) stratum of very fine sandy loam; slight effervescence; mildly alkaline; clear wavy boundary.

2C2—32 to 39 inches; strong brown (7.5YR 5/6) very fine sandy loam; common fine faint brown mottles; massive; very friable; slight effervescence; mildly alkaline; clear wavy boundary.

2C3—39 to 72 inches; brown (7.5YR 5/4) silt loam and very fine sandy loam; common fine distinct dark grayish brown (10YR 4/2) mottles and common fine faint dark brown mottles; thinly bedded; very friable; thin reddish brown (5YR 4/4) stratum of silty clay loam; slight effervescence; mildly alkaline.

The thickness of the solum and depth to contrasting textures range from 20 to 40 inches. Reaction ranges from neutral to moderately alkaline throughout.

The Ap horizon has hue of 5YR or 7.5YR, value of 3, and chroma of 2 or 3. It is 4 to 8 inches thick.

The Bw horizon has hue of 2.5YR or 5YR, value of 3 or 4, and chroma of 3 or 4. It is clay or silty clay, and it is calcareous in some pedons.

The 2C horizon is very fine sandy loam, silt loam, or silty clay loam and is calcareous.

Newellton Series

The Newellton series consists of somewhat poorly drained, slowly permeable soils that formed in recent clayey alluvium underlain by loamy alluvium. These soils are on natural levees of the Mississippi River. The Newellton soils have a seasonal high water table at a depth of 1 foot to 3 feet below the surface during December through April of most years. Slopes range from 0 to 5 percent.

The soils of the Newellton series are clayey over loamy, montmorillonitic, nonacid, thermic Aeric Fluvaquents.

The Newellton soils are similar to the Tensas and Tunica soils, and commonly are near the Commerce and Sharkey soils. The Commerce soils, in slightly higher positions than Newellton soils, are loamy throughout. Sharkey soils are poorly drained. They are in lower positions and are clayey throughout. The Tensas soils formed in older sediment and unlike the Newellton soils they have an argillic horizon. The Tunica soils are in slightly lower positions than Newellton soils and are clayey to a depth of 20 to 36 inches.

Typical pedon of Newellton clay; 2 miles east of Ferriday, in a soybean field 800 feet west of levee, 87 feet south of fence corner, 51 feet west of fence, Spanish Land Grant sec. 32, T. 8 N., R. 9 E.

Ap—0 to 5 inches; dark gray (10YR 4/1) clay; few fine distinct brown (10YR 5/3) mottles; weak medium subangular blocky structure; very firm; few fine roots; slightly acid; clear smooth boundary.

B—5 to 16 inches; dark grayish brown (10YR 4/2) clay; many medium distinct reddish brown (5YR 4/4) mottles; moderate medium subangular blocky structure; very firm; few fine roots; few fine soft black masses; shiny ped surfaces; neutral; abrupt smooth boundary.

2C1—16 to 20 inches; dark grayish brown (10YR 4/2) silty clay loam; common fine and medium distinct dark brown (7.5YR 4/4) mottles; weak medium subangular blocky structure; firm; few fine roots; few fine soft black masses; few dark gray (10YR 4/1) stains; moderately alkaline; clear smooth boundary.

2C2—20 to 30 inches; grayish brown (10YR 5/2) silt loam; common fine and medium distinct dark brown (7.5YR 4/4) and dark yellowish brown (10YR 4/6) mottles and few fine faint dark gray mottles; weak coarse subangular blocky structure with common bedding planes; friable; few fine roots; common very dark grayish brown (10YR 3/2) wormcasts; moderately alkaline; gradual smooth boundary.

2C3—30 to 46 inches; grayish brown (10YR 5/2) very fine sandy loam; common fine and medium distinct dark yellowish brown (10YR 4/4) and few fine faint gray mottles; massive with common bedding planes; very friable; few fine roots; common very dark grayish brown (10YR 3/2) wormcasts; strata (1 inch thick) of reddish brown (5YR 4/4) silt loam at a depth of 34 inches; moderately alkaline; gradual smooth boundary.

2C4—46 to 60 inches; brown (10YR 5/3) very fine sandy loam; many fine distinct yellowish brown (10YR 5/6) and many fine faint grayish brown mottles; massive with common bedding planes; very friable; neutral.

The combined thickness of the clayey A and B horizons ranges from 10 to 20 inches.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. It is 4 to 8 inches thick and ranges from medium acid to neutral.

The B horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2. Texture is clay or silty clay. Reaction ranges from medium acid to mildly alkaline.

The 2C horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. Texture is silt loam, very fine sandy loam, or silty clay loam. Reaction ranges from slightly acid to moderately alkaline.

Norwood Series

The Norwood series consists of well drained, moderately permeable soils that formed in loamy alluvium. These soils are in high positions on natural levees of the Red River. Slopes range from 0 to 3 percent.

The soils of the Norwood series are fine-silty, mixed (calcareous), thermic Typic Udifluvents.

The Norwood soils are similar to the Commerce soils and commonly are near the Latanier soils. Commerce soils are somewhat poorly drained. They are on natural levees of the Mississippi River and are dominantly grayish brown. The Latanier soils are somewhat poorly drained. They are in slightly lower positions than the Norwood soils and they have a clayey, mollic epipedon.

Typical pedon of Norwood silt loam, gently undulating, occasionally flooded; 4 miles west of Blackhawk, 3.9 miles south of levee on a woods road along Red River, 30 feet east of center of a trail, 6 feet south of a large hackberry tree, Spanish Land Grant sec. 1, T. 2 N., R. 7 E.

A—0 to 5 inches; reddish brown (5YR 4/3) silt loam; weak fine granular structure; very friable; many fine and very fine roots; many wormcasts; mildly alkaline; clear smooth boundary.

B—5 to 16 inches; reddish brown (5YR 4/4) silt loam; weak medium subangular blocky structure; friable; many fine and very fine roots; thin stratum of dark reddish brown (5YR 3/4) silty clay loam; many wormcasts; slight effervescence; mildly alkaline; clear smooth boundary.

C1—16 to 23 inches; yellowish red (5YR 4/6) silt loam; weak medium subangular blocky structure; friable; common fine roots; weakly expressed bedding planes; thin stratum of dark reddish brown (5YR 3/4) silty clay loam; many wormcasts; slight effervescence; moderately alkaline; clear smooth boundary.

C2—23 to 57 inches; reddish brown (5YR 4/4) silt loam; massive; stratified with thin layers of yellowish red (5YR 4/6) very fine sandy loam and dark reddish brown (5YR 3/4) silty clay loam; friable; many wormcasts; strong effervescence; moderately alkaline; clear smooth boundary.

C3—57 to 86 inches; reddish brown (5YR 4/4) very fine sandy loam; common fine distinct strong brown (7.5YR 5/6) mottles; massive with common bedding planes; very friable; strong effervescence; mildly alkaline.

The depth to bedding planes ranges from near the surface to 30 inches below the surface. The soil is mildly alkaline or moderately alkaline throughout.

The A horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. It is 4 to 10 inches thick.

The B horizon has hue of 5YR or 7.5YR, value of 4 to 6, and chroma of 4 to 6. It is silt loam or silty clay loam.

The C horizon has hue of 5YR or 7.5YR, value of 4 to 7, and chroma of 3, 4, or 6. It is silt loam, silty clay loam, or very fine sandy loam with thin strata of coarser and finer textures. Buried soils are common below a depth of about 40 inches.

Sharkey Series

The Sharkey series consists of poorly drained, very slowly permeable soils that formed in clayey alluvium. These soils are in low positions on natural levees and in depressions on the Mississippi River alluvial plain. A seasonal high water table is within 2 feet of the surface from December through April in most years. Slopes range from 0 to 3 percent.

The soils of the Sharkey series are very-fine, montmorillonitic, nonacid, thermic Vertic Haplaquepts.

The Sharkey soils are similar to the Alligator, Fausse, and Sostien soils and commonly are near the Commerce, Newellton, and Tunica soils. The Alligator soils formed in older sediment and they have a more acid subsoil than Sharkey soils. The Commerce soils are somewhat poorly drained. They are in higher positions than Sharkey soils and are loamy throughout. The Fausse soils are very poorly drained. They are in lower positions and do not crack so deeply as the Sharkey soils. The Newellton and Tunica soils are in slightly higher positions, and they have a loamy underlying material. The Sostien soils are in disturbed areas and are forming in clayey fill material.

Typical pedon of Sharkey clay; 4 miles west of Vidalia, 1.4 miles south of U.S. Highway 84 on Airport Road to National Guard Armory, 120 feet west and 27 feet north of the southeast fence corner, Spanish Land Grant NE1/4 sec. 13, T. 7 N., R. 9 E.

Ap—0 to 11 inches; dark grayish brown (10YR 4/2) clay; many fine distinct dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/6) mottles; strong very fine angular blocky structure in upper 2 inches, weak medium subangular blocky structure in lower part; very firm; many fine and very fine roots; few fine soft dark brown (10YR 3/3) masses; medium acid; clear smooth boundary.

Bg1—11 to 22 inches; dark gray (10YR 4/1) clay; many fine distinct dark brown (10YR 3/3) mottles; weak medium subangular blocky structure; very firm, very plastic; few fine and very fine roots; shiny surfaces on peds; few fine hard black masses; slightly acid; gradual smooth boundary.

Bg2—22 to 32 inches; dark gray (10YR 4/1) clay; many fine distinct brown (10YR 5/3) mottles; weak medium subangular blocky structure; very firm, very plastic; few fine roots; shiny surfaces on some peds; few nonintersecting slickensides; few hard black masses; neutral; clear smooth boundary.

BCg—32 to 47 inches; dark gray (5Y 4/1) clay; many fine distinct brown (10YR 5/3) mottles; moderate medium subangular blocky structure; very firm, very plastic; few nonintersecting slickensides; few fine accumulations of powdery carbonates; few fine pockets and seams of gypsum crystals; mildly alkaline; clear smooth boundary.

Cg1—47 to 59 inches; gray (5Y 5/1) clay; many medium distinct brown (7.5YR 4/4) and common fine distinct dark yellowish brown (10YR 4/6) mottles; weak coarse subangular blocky structure parting to weak medium angular blocky; very firm, very plastic; shiny surfaces on peds; common nonintersecting slickensides; common fine accumulations of powdery carbonates; common fine pockets and seams of gypsum crystals; neutral; clear smooth boundary.

Cg2—59 to 75 inches; olive gray (5Y 5/2) clay; common fine distinct brown (7.5YR 4/4) and yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure parting to weak medium subangular blocky; very firm, very plastic; common nonintersecting slickensides; few fine accumulations of powdery carbonates; few fine pockets and seams of gypsum crystals; mildly alkaline.

The thickness of the solum ranges from 36 to 60 inches. Cracks 1 to 3 centimeters wide develop to a depth of 20 inches or more in most years.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 1 or 2. Horizons that have value of 3 are less than 10 inches thick. Texture is clay or silt loam. The A horizon is 4 to 15 inches thick and ranges from strongly acid to moderately alkaline.

The Bg and BCg horizons have hue of 10YR or 5Y, value of 4 to 6, and chroma of 1 or 2. They range from medium acid to moderately alkaline.

The Cg horizon has colors similar to the Bg horizon. It is typically clay or silty clay, but it is coarser textured below a depth of 40 inches in some pedons. Reaction ranges from neutral to moderately alkaline.

The Sharkey soils in map unit Sr are taxadjuncts to the Sharkey series, because they have a dark reddish brown surface layer. This is outside the defined range for the series, but this difference does not affect use and management of the soils.

Sostien Series

The Sostien series consists of poorly drained, very slowly permeable soils that formed in sediment dredged from canals or rivers or from land surfaces during construction of waterways. Slopes range from 0 to 5 percent.

The soils of the Sostien series are fine, montmorillonitic, nonacid, thermic Vertic Fluvaquents.

The Sostien soils are similar to the Alligator, Fausse, and Sharkey soils and commonly are near the Cocodrie and Crevasse soils. The Alligator, Fausse, and Sharkey soils are in adjacent undisturbed areas and lack streaks and strata of loamy material in the solum. The Cocodrie and Crevasse soils are in similar positions as the Sostien soils and they are loamy throughout.

Typical pedon of Sostien clay; in an area of Sostien-Crevasse association, 0 to 5 percent slopes, 3.5 miles west of the Old River Control Structure, Three Rivers Wildlife Management Area, 1.5 miles west of levee on shell road, 0.8 mile south of road, 300 feet south and 255 feet east of a trail, unsectionized area, T. 1 N., R. 8 E.

A—0 to 4 inches; dark grayish brown (10YR 4/2) clay; common fine distinct dark brown (10YR 3/3) and yellowish brown (10YR 5/6) mottles; few fine faint dark gray mottles; weak coarse subangular blocky structure; firm, plastic, and sticky; common fine and medium roots; 1/4-inch thick layer of very dark gray (10YR 3/1) clay at surface; moderately alkaline; clear smooth boundary.

Cg—4 to 65 inches; gray (10YR 5/1, 5Y 5/1) clay; many fine and medium prominent strong brown (7.5YR 5/8) and dark brown (7.5YR 4/4) mottles; common fine distinct yellowish brown (10YR 5/6) mottles; massive; very firm, very sticky, and plastic; common fine, medium, and coarse roots in upper part; many distinct large clods of soil in varying shades of gray; thin discontinuous bedding planes are evident in some clods; about 10 percent of the matrix is grayish brown (10YR 5/2) fine sandy loam that surrounds some clods and is in pockets or in vertical, horizontal, and diagonal streaks; few fine and medium soft masses of carbonates; moderately alkaline.

Reaction ranges from slightly acid to moderately alkaline throughout.

The A horizon has hue of 10YR, 2.5Y, or 5Y, value of 3 or 4, and chroma of 1 to 3.

The Cg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 or 2. Texture is clay or silty clay. Few to common pockets, streaks, or strata of sandy or loamy materials occur throughout. Accumulations of calcium carbonate range from none to common.

Tensas Series

The Tensas series consists of somewhat poorly drained, very slowly permeable soils that formed in clayey alluvium underlain by loamy alluvium. These soils are on the older natural levees of the Mississippi River and its distributaries. The Tensas soils have a seasonal high water table at a depth of 1 foot to 3 feet below the surface from December through April in most years. Slopes range from 0 to 5 percent.

The soils of the Tensas series are fine, montmorillonitic, thermic Aeric Ochraqualfs.

The Tensas soils are similar to the Baldwin and Tunica soils and commonly are near the Alligator and Dundee soils. The Alligator soils, in lower positions than Tensas soils, are clayey throughout. The Baldwin soils formed in older sediment than the Tensas soils and are less acid in the lower part of the subsoil. The Dundee soils, in slightly higher positions, are loamy throughout. The Tunica soils formed in younger sediment than the Tensas soils and do not have an argillic horizon.

Typical pedon of Tensas silty clay; 4 miles south of Monterey, 54 feet west and 36 feet north of the southeast corner of the SW1/4NE1/4 sec. 22, T. 5 N., R. 7 E.

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) silty clay; moderate fine granular structure in upper part, weak coarse subangular blocky structure in lower part; very firm; common fine and very fine roots; strongly acid; clear smooth boundary.

Bt1—5 to 10 inches; grayish brown (10YR 5/2) silty clay; many fine and medium distinct strong brown (7.5YR 5/6) and common fine distinct brown (7.5YR 4/4) mottles; moderate coarse subangular blocky structure parting to moderate medium subangular blocky; very firm, sticky and very plastic; common fine and very fine roots along surfaces of peds; thin patchy dark gray (10YR 4/1) clay films on surface of peds; very strongly acid; clear smooth boundary.

Bt2—10 to 21 inches; dark grayish brown (10YR 4/2) clay; many fine and medium distinct brown (7.5YR 4/4) and strong brown (7.5YR 5/6) mottles; strong medium subangular blocky structure; very firm, sticky and very plastic; common fine and very fine roots along ped surfaces; continuous moderately thick dark gray (10YR 4/1) clay films on surface of peds and in root channels; few fine soft dark brown (10YR 3/3) masses; very strongly acid; clear smooth boundary.

Bt3—21 to 29 inches; grayish brown (10YR 5/2) silty clay; many fine and medium distinct brown (7.5YR 4/4) and strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; very firm; few fine and very fine roots; many very fine pores; nearly continuous thin dark gray (10YR 4/1) clay films on surface of peds and in pores; few fine soft dark brown (10YR 3/3) masses; medium acid; clear smooth boundary.

2BC1—29 to 34 inches; grayish brown (10YR 5/2) clay loam; many fine and medium distinct brown (7.5YR 4/4) and strong brown (7.5YR 5/6) mottles and common fine distinct yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure parting to moderate medium subangular blocky; friable; few very fine roots; thin patchy dark gray (10YR 4/1) clay films on surface of some peds and in pores; few fine soft dark brown (10YR 3/3) masses; strongly acid; gradual smooth boundary.

2BC2—34 to 43 inches; grayish brown (10YR 5/2) clay loam; many fine distinct yellowish brown (10YR 5/6) and few fine distinct brown (7.5YR 4/4) mottles; weak coarse subangular blocky structure parting to moderate medium subangular blocky; firm; few very fine roots; many very fine pores; thin patchy dark gray (10YR 4/1) clay films on surface of some peds and in pores; common fine soft dark brown (10YR 3/3) masses; strongly acid; gradual smooth boundary.

2C—43 to 65 inches; grayish brown (10YR 5/2) clay loam; many fine and medium distinct yellowish brown (10YR 5/6, 5/4) mottles and common fine distinct brown (7.5YR 4/4) mottles; weak coarse subangular blocky structure; firm; few fine and very fine roots; many very fine pores; few thin patchy dark gray (10YR 4/1) clay films on surface of some peds and in pores; common fine soft dark brown (10YR 3/3) masses; medium acid.

The thickness of the solum ranges from 30 to 50 inches. Depth to the loamy 2B horizon is 20 to 36 inches.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. It is 3 to 8 inches thick and ranges from very strongly acid to medium acid.

The Bt horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 or 2. It is clay or silty clay and ranges from very strongly acid to medium acid.

The 2BC and 2C horizons have hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 or 3. These horizons are silty clay loam, clay loam, silt loam, very fine sandy loam, or loam. Reaction ranges from strongly acid to slightly acid.

Tunica Series

The Tunica series consists of poorly drained, very slowly permeable soils that formed in clayey alluvium underlain by loamy alluvium. These soils are in low positions on natural levees of the Mississippi River. The Tunica soils have a seasonal high water table at a depth of 1 foot to 3 feet below the surface during January through April of most years. Slopes range from 0 to 3 percent.

The soils of the Tunica series are clayey over loamy, montmorillonitic, nonacid, thermic Vertic Haplaquepts.

The Tunica soils are similar to the Newellton and Tensas soils and commonly are near the Bruin, Commerce, and Sharkey soils. The Bruin and Commerce soils, in higher positions than Tunica soils, are loamy throughout. The Newellton soils are in slightly higher positions and have 12 to 20 inches of clay underlain by loamy layers. The Sharkey soils, in slightly lower positions, are clayey throughout. The Tensas soils formed in older sediment than the Tunica soils and they have an argillic horizon.

Typical pedon of Tunica clay; 1.8 miles north of Ferriday, 0.3 mile north of Panola Woods Country Club road on U.S. Highway 65, 0.5 mile northwest of U.S. Highway 65 on field road, 132 feet northeast of ditch bank, Spanish Land Grant sec. 45, T. 8 N., R. 9 E.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) clay; common fine faint brown mottles; strong fine subangular blocky structure; very firm; few fine roots; slightly acid; clear smooth boundary.

Bg1—6 to 16 inches; dark gray (10YR 4/1) clay; many fine and medium distinct dark brown (7.5YR 4/4) and dark yellowish brown (10YR 4/6) mottles; moderate medium subangular blocky structure; very firm; few fine roots; common fine soft black masses; slightly acid; clear smooth boundary.

Bg2—16 to 26 inches; dark gray (5Y 4/1) clay; few fine distinct dark brown (10YR 3/3) and dark yellowish brown (10YR 4/4) mottles; moderate medium subangular blocky structure; very firm; few fine roots; few nonintersecting slickensides; common fine soft black masses; slightly acid; abrupt smooth boundary.

2Cg1—26 to 32 inches; dark gray (10YR 4/1) silty clay loam; common fine distinct dark brown (10YR 3/3) and brown (10YR 5/3) mottles; weak coarse subangular blocky structure; friable; few fine roots; neutral; abrupt wavy boundary.

2Cg2—32 to 44 inches; grayish brown (2.5Y 5/2) very fine sandy loam; common fine distinct yellowish brown (10YR 5/6) and dark brown (10YR 3/3) mottles and few fine distinct dark gray (10YR 4/1) mottles; massive; thinly stratified; very friable; common fine soft black masses; few fine soft powdery masses of carbonates; few fine concretions of carbonates; slight effervescence; mildly alkaline; gradual wavy boundary.

2Cg3—44 to 80 inches; olive gray (5Y 5/2) silt loam; common fine and medium distinct yellowish brown (10YR 5/6) and dark brown (7.5YR 4/4) mottles and few fine distinct dark gray (10YR 4/1) mottles; massive; thinly stratified; very friable; common fine soft black masses; common fine soft powdery masses of carbonates; few fine concretions of carbonates; slight effervescence; moderately alkaline.

The thickness of the solum and depth to loamy 2Cg horizons range from 20 to 36 inches. Reaction ranges from medium acid to mildly alkaline throughout the solum and from medium acid to moderately alkaline in the underlying material.

The A horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 1 or 2. It is 3 to 12 inches thick. Horizons with value of 3 are less than 6 inches thick.

The Bg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 or 2. Texture is clay or silty clay.

The 2Cg horizon has colors similar to the Bg horizon. Texture is silt loam, loam, silty clay loam, very fine sandy loam, or fine sandy loam.

Formation of the Soils

Dr. Bobby J. Miller, Department of Agronomy, Louisiana State University, helped prepare this section.

In this section, the processes and factors of soil formation are described as they relate to the soils in the survey area.

Processes of Soil Formation

The processes of soil formation influence the kind and degree of development of soil horizons. The rate and relative effectiveness of different processes are determined by the factors of soil formation: climate, living organisms, relief, parent material, and time.

Soil-forming processes result in additions of organic, mineral, and gaseous materials to the soil; losses of these same materials from the soil; translocation of materials from one point to another within the soil; and physical and chemical transformation of mineral and organic material within the soil *(27)*.

Many processes take place simultaneously. Examples in the survey area include accumulation of organic matter, development of soil structure, and leaching of bases from some soil horizons. The contribution of a particular process can change over time. For example, levee protection has reduced flooding and has resulted in a reduced rate of sediment accumulation on many soils in the survey area. Some important processes that have contributed to the formation of soils in Concordia Parish are discussed in the following paragraphs.

Organic matter has accumulated and has been partly decomposed and incorporated into all the soils. Organic matter production is greatest in and above the surface horizon. This results in the formation of soils in which the surface horizon is higher in organic matter content and is darker than the deeper horizons. Exceptions are soils having a dark surface layer of an older soil that was buried by more recent alluvium.

The decomposition and mixing of organic residue into the soil horizons are brought about largely by the activity of living organisms. Many of the more stable products of decomposition remain as finely divided material that increase granulation and are a source of plant nutrients in the soil. In the Fausse soils, the A horizon has been darkened by the accumulation of organic matter.

Intermittent additions of alluvial sediment at the surface helped to form some of the soils in the parish. Added sediment provides new parent material in which processes of soil formation then occur. In many cases, new material accumulated faster than the processes of soil formation could appreciably alter it. The evident depositional strata in the Norwood soils are a result of accumulation of this sort. Sediment accumulation is also indicated by the contrasting textures in the Newellton, Tunica, and Latanier soils.

Processes resulting in development of soil structure have taken place in most of the soils. Plant roots and other organisms are effective agents in the rearrangement of soil material into secondary aggregates. Decomposition products or organic residue and secretions of organisms serve as cementing agents that help to stabilize structural aggregates. Alternate wetting and drying as well as shrinking and swelling contribute to the development of structural aggregates. This is particularly effective in soils such as Sharkey soils that have appreciable amounts of clay.

The translocation of elements from upper to lower soil horizons is an important process in soil formation. Water moving through the soil leaches soluble bases and any free carbonates that were initially in the upper horizons. This process is indicated by a more alkaline soil reaction in lower horizons than in the surface horizon, and by the absence of free carbonates in the surface horizon of soils that are calcareous in lower horizons. The effects of leaching are most pronounced in the Alligator, Dundee, and Tensas soils. These soils formed in the oldest sediment in the survey area. They are acid throughout or at least in the upper horizons except surface horizons. The other soils in the survey area are not so leached and typically are neutral or alkaline in the upper horizons.

The poorly drained and very poorly drained soils in the survey area have horizons in which reduction and segregation of iron and manganese compounds are important processes. Reducing conditions prevail for long periods in poorly aerated horizons. Consequently, the more soluble reduced forms of iron and manganese predominate over the much less soluble oxidized forms. Reduced forms of these elements result in the gray colors that are characteristics of the Bg and Cg horizons; for example, the Fausse, Sharkey, and Tunica soils. In the more soluble reduced forms, appreciable amounts of iron and manganese can be removed from the soils or translocated by water from one place to another within the soil. Brown mottles in predominantly gray horizons indicate segregation and concentration of oxidized iron compounds resulting from alternate oxidizing and reducing conditions in the soils.

The formation, translocation, and accumulation of clay were important processes during the development of the Baldwin, Dundee, and Tensas soils. Silicon and aluminum, released as a result of weathering of such minerals as pyroxenes, amphiboles, and feldspars, can recombine with the components of water to form secondary clay minerals such as kaolinite. Layer silicate minerals, such as biotite and montmorillonite, can also weather to form other clay minerals such as vermiculite or kaolinite. Horizons of secondary accumulation of clay result largely from translocation of clays from upper to lower horizons. As water moves downward, it can carry small amounts of clay in suspension. This clay is deposited, and it accumulates at the depths of penetration of the water or in horizons where it becomes flocculated or is filtered out by fine pores in the soil. Over long periods, such processes can result in distinct horizons of secondary clay accumulation.

In some soils, secondary accumulations of calcium carbonate can be present in the lower part of the subsoil. Carbonates dissolved from overlying horizons may have been translocated to this depth by water and redeposited. Other sources and processes may contribute in varying degrees to carbonate accumulations; for example, segregation of material within the horizons, upward translocation of material in solution from deeper horizons during fluctuations of water table levels, and contributions of material from readily weatherable minerals such as plagioclase feldspars. Calcium carbonate was initially present in the sediment that was parent material for Latanier and Norwood soils. These soils typically contain calcium carbonate throughout horizons below a depth of about 20 inches.

Factors of Soil Formulation

Soil is a natural, three-dimensional body that formed on the earth's surface. It has properties resulting from the integrated effect of climate and living organisms acting on parent material, as conditioned by relief over time.

The interaction of five main factors influences processes of soil formation and results in differences among the soils. The factors are the physical and chemical composition of the parent material, the climate during the formation of soil from the parent material, the kinds of plants and other organisms living in the soil, the relief of the land and its effect on runoff and soil moisture conditions, and the length of time for the soil to form *(16)*.

A factor's effect can differ from place to place, but the interaction of all the factors determines the kind of soil that forms. Many soil differences can not be attributed to differences in only one factor. For example, organic matter content in the soils in Concordia Parish is influenced by several factors—including relief, parent material, and living organisms. This does not diminish the importance of any given factor's influence on a specific soil property. In the following paragraphs the factors of soil formation are discussed as they relate to the soils in the survey area.

Parent material

Parent material is the material from which the soils developed. The soils in Concordia Parish are mineral soils that formed mainly in unconsolidated Mississippi River and Red River sediment of the natural levees and associated backswamps.

Sediment carried by the Mississippi River is of varied origin. It may have originated anywhere in the drainage area that extends from western Montana to eastern Pennsylvania. The sediment has a diverse mineralogy, and it's sorting during deposition has resulted in marked differences in the parent material of soils formed in the alluvium. Mineralogical studies of the alluvium indicate that smectite minerals are predominant in the clay-size fraction, with secondary amounts of micaceous clays *(28)*. Associated with these are lesser amounts of kaolinite, chlorite-vermiculite intergrade, and quartz minerals. The sand and silt-sized fractions are made up largely of quartz. A sizeable component of feldspars and smaller amounts of a variety of minerals, including such readily weatherable components as biotite and hornblende are also evident.

When it is deposited, Mississippi River sediment does not have detectable quantities of calcium carbonate. By comparison, Red River sediment contains less smectite and more kaolinite and micaceous clays in the clay-sized fraction and does contain calcium carbonate at the time of deposition. The Red River alluvium gets its reddish color from oxides of iron associated with the sand, silt, and particularly the clay-sized fraction. Reddish Permian age formations exposed in western parts of the drainage basin are the major source of this red sediment.

Partial sorting of the alluvium takes place when the stream overflows and the initial decrease in velocity and transporting capability results in rapid deposition of sediment. As the velocity of the water decreases, the initial deposits are high in sand. These deposits are followed by sediment that is high in silt. This is followed by more clayey material.

The clayey backswamp sediment is deposited from still or slowly moving water in low areas behind natural levees. Consequently, the natural levees are highest and have the greatest sand content near the river. Characteristically, their long, gentle slopes extend from the river to the clayey backswamp deposits.

Soils developed in sediments associated with the present Mississippi River meander belt are Bruin, Commerce, Crevasse, Fausse, Newellton, Sharkey, and Tunica. Crevasse soils are mainly between the river and the protection levee constructed and maintained by the U.S. Army Corps of Engineers. The Crevasse, Bruin, Commerce, and Sharkey soils formed in coarse, intermediate, and fine textured parent material. A number of differences in these soils can be attributed, wholly or in part, to differences in the parent material. For example, as the amount of clay increases in soil, so do cation exchange capacity, organic matter content, and volume changes upon wetting and drying. Soil permeability, soil aeration, and content of readily weatherable minerals decrease as the amount of clay increases. Consequently, the loamy soils are generally more productive for most agricultural crops and also provide the most desirable sites in the parish for most urban and industrial uses.

Fausse soils formed in clayey deposits similar to the parent material of Sharkey soils. The major differences between Fausse and Sharkey soils result from factors other than parent material differences. The Newellton and Tunica soils formed in areas where clayey alluvium about 12 to 36 inches thick overlies loamy alluvium.

Soils developed in older Mississippi River meander belt sediment are, in order of decreasing clay content, Alligator, Tensas, Baldwin, and Dundee.

Sediment carried by the Red River originated mainly from the reddish prairie soils of Oklahoma and Texas. The soil formed in this sediment is typically reddish brown, alkaline, and calcareous. Norwood soils formed in recent, loamy, natural levee deposits of the River Red; Latanier soils formed in lower positions where clayey Red River deposits overlie loamy Red River sediment.

Climate

Concordia Parish is in a region characterized by a humid, subtropical climate. Discussion of the climate appears in this survey in the section "General nature of the parish." Because of the relatively young age of most of the parent material, soils in the parish developed under climatic conditions similar to the present.

The climate is relatively uniform throughout the parish; therefore, local differences in soils that developed in parent material similar in age are not a result of differences in atmospheric climate. The warm temperatures and large amount of precipitation favor rapid weathering of minerals in the soils. However, soils in the survey area are only slightly weathered because they have been exposed to weathering agents for only short periods. To some extent, weathering and leaching have occurred in most of the soils. This is indicated by soil reactions that become more alkaline with depth and by the absence of free carbonates in upper horizons of soils such as Baldwin, Tunica, and many others. Weathering processes involving the release and reduction of iron are evident in soils such as Fausse and Sharkey that have gray Bg or Cg horizons. Oxidation and segregation of iron resulting from alternate oxidizing and reducing conditions are indicated by mottled horizons in most of the soils.

The effect of climate is also evident in the clayey soils that have large amounts of expanding-lattice minerals, in which large changes in volume occur upon wetting and drying. Wetting and drying cycles and associated volume changes contribute to the formation and stabilization of structural aggregates in the soils. When the wet soils dry, cracks of variable width and depth can form as a result of the decrease in volume. Climate influences the formation of these cracks and the depth and extent of cracking. Repeated large changes in volume frequently result in structural problems if the soils are used for buildings, roads, and other improvements.

Formation of deep, wide cracks may shear roots of plants. If cracks are present, much of the water from rainfall or irrigation enters the soil through the cracks. Once the soil has become wet, however, infiltration is slow or very slow. Cracks form extensively in Alligator, Latanier, Sharkey, Tensas, and Tunica soils late in summer and early in fall when the soils are driest. Cracks an inch or more wide extend to a depth of more than 20 inches in most years. Cracks that are less extensive and less deep sometimes form in the more silty Baldwin, Commerce, Dundee, Newellton, and Norwood soils and the clayey Fausse soils. Fausse soils do not dry out so deeply as the Sharkey soils and, as a result, have shallower cracks. Cracks do not form in the loamy Bruin or sandy Crevasse soils.

Time

The kinds of horizons and their degree of development are influenced by time. Long periods are generally required for prominent horizons to form. In many areas, the differences in soil formation for different soils may amount to several thousand years. Large differences can exist among the soils, mainly because of differences in time of soil formation *(8, 13)*.

Bruin, Commerce, Crevasse, Fausse, Latanier, Newellton, Norwood, Sharkey, and Tunica soils are considered the youngest soils in the parish. They developed in the most recent alluvium, which is probably less than about 3,000 years old. Alligator, Baldwin, Dundee, and Tensas soils formed in somewhat older alluvium, which is possibly 7,000 years old *(26)*.

The youngest soils have only faint profile development. For example, Commerce soils retain many of the characteristics of their alkaline, loamy parent material. Evidence of the faint development is a darkening of the A horizon by organic matter and a weakly developed B horizon. Crevasse soils have even less profile development. About the only evidence of age of these soils is the darkening of the A horizon by organic matter.

In contrast, Alligator, Dundee, and Baldwin soils, all of which formed in older parent material, have distinct profile development. They have been leached of most carbonates and other soluble salts and are acid. Fine clay has moved downward from the A horizon to form a strongly developed Bt horizon in Dundee and Baldwin soils.

Relief

Relief and other physiographic features influence soil formation processes mainly by affecting internal soil drainage, runoff, erosion and deposition, and exposure to the sun and wind.

In Concordia Parish, the sediment accumulated faster than erosion occurred. Sediment accumulated faster than many of the processes of soil formation. This is evident in the weakly developed B horizons in such soils as Commerce and Norwood and in distinct stratification in the lower horizons of some soils. Levee construction and other water-control measures seem to have reversed this trend for most of the soils. Soil slope and rate of runoff are low enough that erosion is not a major problem in the parish.

An important feature of Concordia Parish is the level to gently undulating land surface. With few exceptions, the entire area is characterized by soils that have slopes of less than 3 percent. Slopes range up to 5 percent in the undulating Dundee and Tensas soils. Relief and landscape position have influenced formation of the different soils. Typically, slopes are long and extend severeal feet from the highest elevations on natural levees to the lower backswamp areas.

Differences in the clayey Sharkey and Fausse soils illustrate the influence of relief. Fausse soils are in the lowest, ponded, backswamp areas, and Sharkey soils are predominantly on higher elevations in the backswamp, and in the lower parts of the natural levees. As compared to clayey soils at higher elevations, Fausse soils in lower elevations have higher organic matter content, are more poorly drained, have thinner sola, and crack to a shallower depth during dry seasons.

Table 23 shows, by parent material, the relationship between slope, runoff, nautral drainage, and depth and duration of a seasonal high water table for soil series mapped in the parish.

From highest to lowest elevations in the present Mississippi River meander belt, the predominant soils typically are Bruin, Commerce, Newellton, Tunica, Sharkey, and Fausse soils. Soils at lower elevations receive runoff from surrounding soils at higher elevations. For example, Commerce soils are somewhat poorly drained, and have a water table ranging from a depth of 1.5 to 4 feet for only short periods during most years. Fausse soils are very poorly drained and often submerged, and have a water table that fluctuates from about 12 inches above the surface to a depth of 1.5 feet or less year-round. Differences in the organic matter content are related to the internal drainage of the soils, and consequently, to relief. Organic matter content generally increases as internal soil drainage becomes more restricted.

Bruin, Commerce, Dundee, and Norwood soils are in higher and better drained positions and oxidation of organic matter is more extensive. The very poorly drained Fausse soils are covered with water for extended periods, resulting in greater reduction and accumulation of more organic matter in the surface layer.

Living Organisms

Living organisms affect the soil formation in a number of ways and exert a major influence on the kind and extent of soil horizons. Plant growth and activity of other organisms disturb the soil. They modify the porosity, influence the tilth, and affect the incorporation of organic matter into the soil.

Photosynthesis, a process by which the sun's energy is used to synthesize compounds necessary for plant growth, produces additional organic matter. Plants recycle soil nutrients and are major sources of organic residue. Decomposition and the incorporation of organic matter into the soil by micro-organisms furthers structure development and generally increases the infiltration rate and available water capacity.

Relatively stable organic compounds in soils generally have very high cation exchange capacities. These compounds increase the capacity of the soil to absorb and store nutrients such as calcium, magnesium, and potassium. The extent of these and other processes and the kinds of organic matter produced can vary widely, depending on the kinds of organisms living in and on the soil. Consequently, large differences in soils can result in areas that have widely contrasting numbers of plants and other organisms.

The soils in Concordia Parish developed under hardwood forests and associated understory and ground cover. Cottonwood, sycamore, and pecan trees are predominant on the higher and better drained soils. Oak, sweetgum, and green ash trees are predominant on the clayey, poorly drained Alligator and Sharkey soils. The native forest on the clayey, very poorly drained Fausse soils includes baldcypress, water tupelo, and water hickory.

Differences in the amount of organic matter that has accumulated in and on the soils are influenced by the kind and quantities of micro-organisms. Aerobic organisms use oxygen from the air and are chiefly responsible for organic matter decomposition through rapid oxidation of organic residue. These organisms are most abundant and prevail for longer periods in the better drained and better aerated Dundee and Norwood soils. Anerobic organisms do not require oxygen from the air, and they decompose organic residues very slowly. They are predominant throughout most or all of the year in the most poorly drained soils. Differences in decomposition by micro-organisms can result in large accumulations of organic matter; for example, in the very poorly drained Fausse soils. The accumulation is much less in the better drained Dundee and Norwood soils.

Landforms and Surface Geology

Dr. Bobby J. Miller, Department of Agronomy, Agricultural Experiment Station, Louisiana State University, helped prepare this section.

Concordia Parish lies entirely within the Mississippi River Alluvial Valley. The parish is an elongated north-south trending area that is completely bounded by large streams. The parish is approximately 55 miles long and 25 miles wide at its longest and widest points. The Mississippi River or its abandoned channels form the entire eastern boundary of the parish. Portions of the state of Mississippi lie west of the river and adjoin the eastern edge of the parish in old meander loops. The meanders were abandoned by the river when it formed a more eastward cutoff channel and after the Louisiana-Mississippi state boundary was established. The Tensas River, the Black and Red Rivers, and the Upper Old River form the northern, western, and southern parish boundaries, respectively. No major streams originate in, or flow through, the parish.

The elevations in the parish range from 30 to 65 feet above mean sea level. The highest elevations occur on natural levees of the Mississippi River in the northern part of the parish. The southern edge of the parish, along Upper Old River, has the lowest elevations. Regionally, the land surface slopes from north to south at a rate of less than one foot per mile. Typically, highest elevations on natural levees of the Mississippi River are five to ten or more feet greater than those along the Tensas, Black, Red, and Upper Old Rivers. Within the parish, drainage water typically moves from the higher natural levees along streams bounding the parish to lower elevations in the parish interior. The extensive clayey backswamp deposits that make up much of the parish interior are one result of this.

The landscape of Concordia Parish is dominated by features that are associated with constructional surfaces that are, in turn, associated with large river systems. The only major exceptions are the manmade flood protection levees along streams or those associated with diversion and flood control structures connecting the Mississippi and Red Rivers. These structures normally divert the entire flow of the Red River and a portion of the Mississippi's water into the Atchafalaya River. During flood stages on the Mississippi River, large volumes of water can be diverted to the Atchafalaya River and the associated floodway.

Slopes throughout the parish are commonly less than 1 percent. Steeper gradients are restricted almost entirely to very short slopes adjacent to existing or abandoned stream channels. Typically, the highest elevations are on natural levees paralleling the streams with long, gentle slopes extending to lowest elevations in the level, clayey backswamps. Abandoned river channels in various stages of alluviation with "clay plugs" do occur and range from oxbow lakes to low crescent-shaped swamps. Large areas of ridge and swale topography, resulting from development of point bars or other migrating stream features, occur in most areas of the parish. In many areas, more clayey deposits cover part or all of the sandy deposits in which the ridge and swale topography developed. Thus, both ridges and swales may have textures that range from sandy to clayey at the surface depending on the extent of alluviation on the pre-existing ridges and swales.

Holocene Age deposits of the Mississippi and Red Rivers cover the surface of Concordia Parish. Beneath the surface these sediments are stratified with varying textured deposits that become generally coarser with depth. These are underlain by coarse grained Pleistocene Age deposits of the Mississippi River. At depths of 50 to 150 feet, these deposits rest on a Pleistocene Age, erosional surface developed in the underlying Tertiary Age material. The erosional surface on the Teritary Age material developed during periods of Continental glaciation when sea level had receded and the Mississippi River Valley was subject to severe erosional forces. As the glaciers receded and sea level rose, coarse grained sediments were deposited on the eroded surface. As sea level continued to rise and the gradient to sea level decreased, sediment largely filled the incised valley, and rivers carrying sediment to the area developed meandering stream systems. It is from these meandering stream systems that the Holocene Age alluvium was deposited and in which the present soils in the parish formed.

Sediments exposed at the surface in Concordia Parish are comprised entirely of Holocene Age alluvium from the Mississippi and Red Rivers. These sediments were deposited by the meandering rivers along loamy natural levees and areas of rapid overland waterflow, in sandy levee breaks or crevasses, and as clayey backswamps. Sediments associated with river meander belts of different ages, and thus with different time periods within the Holocene, have been identified in the parish. The Red River sediments in the parish are associated with the present river meander belt and are less than about 500 years old *(27)*. Soils developed in the Red River alluvium initially contained free carbonates which are still present throughout, or below a depth of less than 24 inches in some places. Sediments associated with three different Mississippi River meander belts are identified in the parish *(27)*. The oldest and westernmost meander belt ranges from about 6,000 to 4,500 years old. A meander belt intermediate in age and position in the parish ranges from about 4,500 to 2,500 years old. The youngest and easternmost meanderbelt is associated with the present Mississippi River and is less than about

2,500 years old. The development of certain soils in the parish is restricted almost entirely to sediments associated with a given meander belt. There is not, however, a one-to-one correspondence between all soils and specific meander belts. This is to be expected since factors other than time also affect rates, and kinds of soil formation. The Commerce and Crevasse soils developed only on sediments associated with the youngest meander belt. Dundee and Baldwin soils developed mostly in the oldest meander belt deposits. Alligator soils apparently developed only in clayey backswamp deposits associated with the oldest meander belt. Soils common to the two youngest meander belts and their associated backswamp deposits are the Bruin, Fausse, Newellton, Sharkey, Tensas, and Tunica.

References

(1) Abruna, F., R. Perez-Exceolar, J. Vincente-Chandler, R.W. Pearson, and S. Silva. 1974. Response of corn to acidity factors in eight tropical soils. J. Agric. Univ. P.R. 58: 59-77

(2) Abruna-Rodriguez, F., J. Vincente-Chandler, R.W. Pearson, and S. Silva. 1970. Crop response to soil acidity factors in Alfisols and Ultisols: 1. Tobacco. Soil Sci. Soc. Am. Proc. 34: 629-635.

(3) American Association of State Highway and Transportation Officials. 1982. Standard specifications for highway materials and methods of sampling and testing. Ed. 13, 2 vol., illus.

(4) American Society for Testing and Materials. 1985. Standard test method for classification of soils for engineering purposes. ASTM Stand. D 2487.

(5) Baker, A.S. 1970. The degree of mixing lime affects the neutralization of exchangeable aluminum. Soil Sci. Soc. Am. Proc. 34: 954-955.

(6) Black, C.A. 1968. Soil-plant relationships. John Wiley and Sons, Inc., New York.

(7) Brupbacher, R.H., et al. 1970. Fertility levels and lime status of soils in Louisiana. La. Agric. Exp. Stn. Bull. 644.

(8) Buol, S.W., F.D. Hole, and R.J. McCracken. 1973. Soil genesis and classification. Iowa State University Press, Ames, Iowa. 360 pp.

(9) Calhoun, R.D. 1932. A history of Concordia Parish, Louisiana. La. Hist. Q.

(10) Coleman, N.T., and G.W. Thomas. 1967. The basic chemistry of soil acidity. *In* R.W. Person and F. Adams (eds.), Soil acidity and liming. Monogr. 12: 1-256. Amer. Soc. Agron., Madison, Wis.

(11) Foy, C.D. 1974. Effects of aluminum on plant growth. *In* E.W. Carson (ed.), The plant root and its environment. pp. 565-600. University Press of Virginia, Charlottesville.

(12) Hoyt, P.B., and M. Lyborg. 1971. Toxic metals in acid soil: I. Estimation of plant-available aluminum. Soil Sci. Soc. Am. Proc. 35: 236-240.

(13) Jenny, Hans. 1941. Factors of soil formation. McGraw-Hill Book Company, Inc., 281 pp., illus.

(14) Kamprath, E.J. 1970. Exchangeable aluminum as a criterion for liming leached mineral soils. Soil Sci. Soc. Am. Proc. 34: 252-254.

(15) Kamprath, E.J. 1972. Soil acidity and liming. *In* M. Drosdoff (Chairman), Soils of the humid tropics. National Academy of Sciences, Washington, D.C.

(16) Louisiana Summary of Agriculture and Natural Resources, 1981. Compiled by La. Coop. Ext. Serv.

(17) MacLean, A.J., R.L. Halstead, and B.J. Finn. 1972. Effects of lime on extractable aluminum and other soil properties and on barley and alfalfa growth in pot tests. Canadian Journal of Soil Science 52: 427-438.

(18) Martini, J.A., R.A. Kochnann, O.J. Siqueira, and C.M. Borkert. 1974. Response of soybeans to liming as related to soil acidity, Al and Mn toxicities and P in some Oxisols of Brazil. Soil Sci. Am. Proc. 38: 616-620.

(19) Miller, B.J. 1980. Quantities and distribution of exchangeable Al in some soils in Louisiana. Proc. La. Assoc. Agron. 20 and 21.

(20) Miller, B.J. 1980. Quantities and distribution of exchangeable aluminum in Louisiana Soils. La. Agric. 24(2), 16-18.

(21) Pearson, R.W. and F. Adams (ed.) 1967. Soil acidity and liming. Monogr. 12. Amer. Soc. Agron., Madison, Wis.

(22) Peevy, W.J. 1974. Soil test results and their use in making fertilizer and lime recommendations. La. Agric. Exp. Stn. Bull. 660.

(23) Pratt, P.F. 1966. Aluminum. *In* H.D. Chapman (ed.) Diagnostic criteria for plants and soils. pp. 3-12. University of California Division of Agricultural Science, Riverside.

(24) Reeve, N.G., and M.E. Sumner. 1970. Lime requirements of Natal Oxisols based on exchangeable aluminum. Soil Sci. Soc. Am. Proc. 34: 595-598.

(25) Rollo, J.R. 1960. Ground water in Louisiana. La. Dep. Conserv., Water Resour. Bull. 1, 84 pp., illus.

(26) Saucier, R.T. 1974. Quarternary geology of the Lower Mississippi Valley. Arkansas Geol. Sur., Res. Ser. 6, Arkansas Arch. Sur., Univ. Arkansas, Fayetteville, Arkansas, 26 pp., illus.

(27) Simonson, Roy W. 1959. Outline of a generalized theory of soil genesis. Soil Sci. Soc. Am. Proc. 23: 152-156, illus.

(28) Southern Cooperative Series. 1970. A monograph of the soils of the southern Mississippi River Valley Alluvium. Arkansas Agric. Exp. Stn. Bull. 178, Univ. of Arkansas, Fayetteville, Ark., 112 pp.

(29) United States Department of Agriculture. 1951. Soil survey manual. U.S. Dep. Agric. Handb. 18, 503 pp., illus. (Supplements replacing pp. 173-188 issued May 1962.)

(30) United States Department of Agriculture. 1972. Soil survey laboratory methods and procedures for collecting soil samples. Soil Surv. Inves. Rep. 1, 50 pp., illus.

(31) United States Department of Agriculture. 1975. Forest statistics for Louisiana Parishes. Forest Serv., South. For. Exp. Stn., New Orleans, La. Resour. Bull. pp. 50-52.

(32) United States Department of Agriculture. 1975. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. Soil Conserv. Serv., U.S. Dep. Agric. Handb. 436, 754 pp., illus.

(33) United States Department of Agriculture. 1978. Predicting rainfall erosion losses - a guide to conservation planning. Soil Conserv. Serv., U.S. Dep. Agric. Handb. 537.

(34) Winter, A.R., and J.W. Cobb. 1975. A comprehensive development plan for Concordia Parish, Louisiana. Rep. ARW-CP-75-22. 77 pp., illus.

Glossary

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bottom land. The normal flood plain of a stream, subject to flooding.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity, but is more precise in meaning.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels, i.e., clay coating, clay skin.

Coarse textured soil. Sand or loamy sand.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, such as fire, that exposes the surface.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fine textured soil. Sandy clay, silty clay, and clay.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual*. The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is, in part, a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as accumulation of clay, sesquioxides, humus, or a combination of these; prismatic or blocky structure; redder or browner colors than those in the A horizon; or a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Arabic numeral 2 precedes the letter C.

R layer.—Consolidated rock (unweathered bedrock) beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake in inches per hour is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. The soil is not strong enough to support loads.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Subsurface tunnels or pipelike cavities are formed by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor outlets (in tables). In these areas, surface or subsurface drainage outlets are difficult or expensive to install.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of the acidity or alkalinity of a soil expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Rooting depth (in tables). There is a shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Seepage (in tables). The movement of water through the soil adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

Substratum. The part of the soil below the solum.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Weathering. All physical and chemical changes produced by atmospheric agents in rocks or other deposits at or near the earth's surface. These changes result in disintegration and decomposition of the material.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Data recorded in the period 1965-79 at Old River Lock, Louisiana]

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average daily	Maximum temperature higher than--	Minimum temperature lower than--	Average number of growing degree days*	Average	Less than--	More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	57.3	36.9	47.1	80	17	133	5.47	2.48	8.02	8	.2
February---	61.4	38.0	49.7	80	20	111	4.61	2.48	6.47	6	.2
March------	69.5	46.8	58.2	85	27	287	4.94	2.82	6.80	7	.0
April------	77.9	55.9	66.9	87	38	507	6.32	2.12	9.76	6	.0
May--------	83.5	62.2	72.9	93	47	710	5.59	3.00	7.87	6	.0
June-------	90.0	68.3	79.2	97	57	876	3.07	1.31	4.55	5	.0
July-------	91.6	70.9	81.3	99	62	970	5.24	3.55	6.77	9	.0
August-----	90.8	70.0	80.4	97	61	942	4.12	2.12	5.86	7	.0
September--	86.6	66.2	76.4	95	49	792	5.26	1.93	8.03	7	.0
October----	79.0	53.9	66.5	91	37	512	3.04	.78	4.84	4	.0
November---	69.5	45.0	57.3	85	24	266	4.72	1.40	7.40	6	.0
December---	62.6	39.5	51.1	82	20	117	6.62	3.92	9.03	8	.0
Yearly:											
Average--	76.6	54.5	65.6	---	---	---	---	---	---	---	---
Extreme--	---	---	---	99	16	---	---	---	---	---	---
Total----	---	---	---	---	---	6,223	59.00	49.93	67.67	79	.4

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 °F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Data recorded in the period 1965-79
at Old River Lock, Louisiana]

Probability	Temperature 24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	February 26	March 16	March 24
2 years in 10 later than--	February 18	March 8	March 18
5 years in 10 later than--	February 2	February 19	March 6
First freezing temperature in fall:			
1 year in 10 earlier than--	November 17	November 6	October 31
2 years in 10 earlier than--	November 29	November 16	November 6
5 years in 10 earlier than--	December 24	December 6	November 17

TABLE 3.--GROWING SEASON

[Data recorded in the period 1965-79
at Old River Lock, Louisiana]

Probability	Daily minimum temperature during growing season Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	282	259	231
8 years in 10	294	270	239
5 years in 10	320	289	255
2 years in 10	>365	309	272
1 year in 10	>365	319	280

TABLE 4.--SUITABILITY AND LIMITATIONS OF GENERAL SOIL MAP UNITS

General soil map unit	Percent of area	Cultivated crops	Pasture	Woodland	Urban uses
Commerce-Bruin----------	7	Well suited--------	Well suited-----	Well suited------	Moderately well suited: wetness, shrink-swell, moderately slow permeability.
Dundee-Baldwin----------	4.3	Well suited--------	Well suited-----	Well suited------	Moderately well suited: wetness, shrink-swell, moderately slow or very slow permeability.
Alligator-Tensas-Dundee	29	Moderately well suited: wetness, poor tilth, slope.	Moderately well suited: wetness.	Well suited------	Poorly suited: wetness, flooding, shrink-swell, very slow permeability.
Sharkey-Tunica----------	10	Moderately well suited: wetness, poor tilth, slope.	Moderately well suited: wetness.	Well suited------	Poorly suited: wetness, flooding, shrink-swell, very slow permeability.
Commerce-Bruin-Newellton	10	Poorly suited: flooding, wetness.	Poorly suited: flooding, wetness.	Moderately well suited: flooding, wetness.	Unsuited: flooding, wetness.
Sharkey-Fausse----------	10	Poorly suited: flooding, wetness.	Poorly suited: flooding, wetness.	Moderately well suited: flooding, wetness.	Unsuited: flooding, wetness.
Sharkey-Alligator-Tensas-----------------	29	Somewhat poorly suited: flooding, wetness, poor tilth.	Moderately well suited: flooding, wetness.	Well suited------	Poorly suited: flooding, wetness.
Norwood-Latanier--------	0.7	Moderately well suited: flooding, wetness.	Moderately well suited: flooding.	Well suited------	Poorly suited: flooding, wetness.

TABLE 5.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
Aa	Alligator clay	19,314	4.0
Ab	Alligator clay, occasionally flooded	31,660	6.6
Ac	Alligator clay, gently undulating, occasionally flooded	7,510	1.6
Ba	Baldwin silty clay loam	8,880	1.9
Bn	Bruin silt loam	5,716	1.2
Br	Bruin silt loam, gently undulating	860	0.2
Bu	Bruin silt loam, occasionally flooded	1,221	0.3
Bw	Bruin-Tunica complex, gently undulating	4,006	0.8
Ca	Commerce silt loam	9,853	2.1
Cb	Commerce silt loam, gently undulating	2,298	0.5
Cc	Commerce silt loam, occasionally flooded	586	0.1
Cm	Commerce silty clay loam	7,600	1.6
Co	Commerce silty clay loam, occasionally flooded	2,010	0.4
CR	Commerce and Bruin soils, frequently flooded	23,515	4.9
Cv	Crevasse fine sand, frequently flooded	6,182	1.3
Dd	Dundee loam	12,465	2.6
De	Dundee silty clay loam	780	0.2
Dh	Dundee-Alligator-Tensas complex, gently undulating	12,618	2.6
Ds	Dundee-Alligator-Tensas complex, undulating	10,559	2.2
Fa	Fausse clay	9,776	2.0
La	Latanier clay, gently undulating, occasionally flooded	675	0.1
Ne	Newellton clay	801	0.2
NS	Newellton and Sharkey soils, frequently flooded	15,546	3.2
Nw	Norwood silt loam, gently undulating, occasionally flooded	2,324	0.5
Sa	Sharkey silt loam	882	0.2
Sh	Sharkey clay	29,907	6.2
Sk	Sharkey clay, occasionally flooded	49,185	10.3
Sm	Sharkey clay, gently undulating, occasionally flooded	9,021	1.9
So	Sharkey clay, frequently flooded	43,611	9.1
Sr	Sharkey clay, overwash, occasionally flooded	2,626	0.5
SS	Sostien-Cocodrie association, occasionally flooded	2,744	0.6
ST	Sostien-Crevasse association, 0 to 5 percent slopes	1,569	0.3
Tc	Tensas silty clay	10,226	2.1
Te	Tensas silty clay, occasionally flooded	2,895	0.6
To	Tensas-Alligator complex, undulating	70,474	14.8
Tr	Tensas-Alligator complex, undulating, occasionally flooded	15,539	3.2
Ts	Tunica clay	2,075	0.4
Tt	Tunica clay, occasionally flooded	2,679	0.6
Tu	Tunica-Sharkey complex, gently undulating	9,004	1.9
Ty	Tunica-Sharkey complex, gently undulating, occasionally flooded	2,591	0.5
	Small water	5,100	1.1
	Large water	22,230	4.6
	Total	479,113	100.0

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Map symbol and soil name	Land capability	Soybeans	Cotton lint	Wheat	Rice	Improved bermudagrass	Tall fescue
		Bu	Lbs	Bu	Bu	AUM*	AUM*
Aa-------------- Alligator	IIIw	35	600	40	130	---	9.0
Ab, Ac---------- Alligator	IVw	25	450	35	---	---	8.0
Ba-------------- Baldwin	IIIw	33	700	---	120	---	8.5
Bn-------------- Bruin	I	40	900	---	---	15.5	---
Br-------------- Bruin	IIe	35	850	---	---	15.5	---
Bu-------------- Bruin	IIw	35	750	---	---	---	---
Bw:							
Bruin-----------	IIe	35	750	---	---	13.5	---
Tunica----------	IIIw	35	750	---	---	13.5	---
Ca-------------- Commerce	IIw	40	900	---	---	15.5	---
Cb-------------- Commerce	IIw	30	800	---	---	14.5	---
Cc-------------- Commerce	IIIw	30	700	---	---	---	---
Cm-------------- Commerce	IIw	40	850	---	---	15.0	---
Co-------------- Commerce	IIIw	30	700	---	---	---	---
CR-------------- Commerce and Bruin	Vw	---	---	---	---	---	---
Cv-------------- Crevasse	Vw	---	---	---	---	---	---
Dd, De---------- Dundee	IIw	40	750	45	---	9.0	9.0
Dh, Ds---------- Dundee-Alligator-Tensas	IIIw	35	660	40	---	---	9.0
Fa-------------- Fausse	VIIw	---	---	---	---	---	---

See footnote at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Land capability	Soybeans	Cotton lint	Wheat	Rice	Improved bermudagrass	Tall fescue
		Bu	Lbs	Bu	Bu	AUM*	AUM*
La Latanier	IVw	30	---	---	---	---	---
Ne Newellton	IIw	40	675	---	---	12.0	---
NS Newellton and Sharkey	Vw	---	---	---	---	---	---
Nw Norwood	IIw	40	---	---	---	15.0	---
Sa, Sh Sharkey	IIIw	40	650	40	130	---	9.0
Sk, Sm Sharkey	IVw	30	---	30	---	---	---
So Sharkey	Vw	---	---	---	---	---	---
Sr Sharkey	IVw	30	---	30	---	---	---
SS: Sostien	IVw	---	---	---	---	---	8.0
Cocodrie	IIIw	---	---	---	---	---	---
ST: Sostien	IIIe	---	---	---	---	---	9.0
Crevasse	IVs	---	---	---	---	---	---
Tc Tensas	IIIw	40	600	40	130	---	9.0
Te Tensas	IVw	30	---	---	---	---	---
To Tensas-Alligator	IIIw	30	550	30	---	---	9.0
Tr Tensas-Alligator	IVw	28	---	---	---	---	---
Ts Tunica	IIIw	35	625	45	---	10.5	9.5
Tt Tunica	IVw	35	---	---	---	8.5	---
Tu Tunica-Sharkey	IIIw	30	590	30	---	---	9.0
Ty Tunica-Sharkey	IVw	28	---	---	---	---	---

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

TABLE 7.--CAPABILITY CLASSES AND SUBCLASSES

[Miscellaneous areas are excluded. Absence of an entry indicates no acreage]

Class	Total acreage	Major management concerns (Subclass)		
		Erosion (e)	Wetness (w)	Sandy (s)
		Acres	Acres	
I	5,716	---	---	---
II	38,202	860	37,342	
III	182,852	939	181,913	---
IV	126,383	---	125,753	630
V	88,854	---	88,854	---
VI	---	---	---	---
VII	9,776	---	9,776	---
VIII	---	---	---	---

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Map symbol and soil name	Ordination symbol	Management concerns			Potential productivity		Trees to plant
		Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	
Aa----------------- Alligator	2w	Severe	Moderate	Moderate	Sugarberry----------	---	Eastern cottonwood, sweetgum, American sycamore.
					Green ash-----------	80	
					Water oak-----------	90	
					Sweetgum------------	90	
					Nuttall oak---------	---	
Ab, Ac------------- Alligator	2w	Severe	Moderate	Moderate	Sugarberry----------	---	Eastern cottonwood, sweetgum, American sycamore.
					Green ash-----------	80	
					Overcup oak---------	---	
					Sweetgum------------	90	
					Nuttall oak---------	---	
Ba----------------- Baldwin	2w	Severe	Moderate	Moderate	Green ash-----------	80	Eastern cottonwood, sweetgum, American sycamore.
					Water oak-----------	90	
					Pecan---------------	---	
					Sweetgum------------	90	
					Sugarberry----------	---	
Bn, Br, Bu--------- Bruin	1o	Slight	Slight	Severe	Green ash-----------	---	Eastern cottonwood, sweetgum, American sycamore.
					Eastern cottonwood--	105	
					Pecan---------------	---	
					Sweetgum------------	105	
					American sycamore---	---	
					Sugarberry----------	---	
Bw: Bruin---------------	1o	Slight	Slight	Severe	Green ash-----------	---	Eastern cottonwood, sweetgum, American sycamore.
					Eastern cottonwood--	105	
					Pecan---------------	---	
					Sweetgum------------	105	
					American sycamore---	---	
					Sugarberry----------	---	
Tunica-------------	2w	Severe	Moderate	Moderate	Green ash-----------	100	Cherrybark oak, eastern cottonwood, green ash, Nuttall oak, sweetgum, American sycamore.
					Nuttall oak---------	105	
					Sweetgum------------	90	
					Sugarberry----------	---	
Ca, Cb, Cc, Cm, Co-- Commerce	1w	Moderate	Slight	Severe	Green ash-----------	80	Eastern cottonwood, American sycamore.
					Eastern cottonwood--	120	
					Nuttall oak---------	90	
					Pecan---------------	---	
					American sycamore---	---	
					Sugarberry----------	---	
CR: Commerce-----------	1w	Moderate	Slight	Severe	Green ash-----------	80	Eastern cottonwood, American sycamore.
					Eastern cottonwood--	120	
					Nuttall oak---------	90	
					Pecan---------------	---	
					American sycamore---	---	
					Sugarberry----------	---	

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns			Potential productivity		Trees to plant
		Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	
CR:							
Bruin	1o	Slight	Slight	Severe	Green ash	---	Eastern cottonwood, sweetgum, American sycamore.
					Eastern cottonwood	105	
					Pecan	---	
					Sweetgum	105	
					American sycamore	---	
					Sugarberry	---	
Cv	2s	Moderate	Severe	Slight	Eastern cottonwood	100	Eastern cottonwood, American sycamore.
Crevasse					Black willow	---	
Dd, De	2w	Moderate	Slight	Moderate	Sugarberry	---	Eastern cottonwood, sweetgum, water oak.
Dundee					Cherrybark oak	105	
					Sweetgum	100	
					Water oak	95	
					Willow oak	---	
Dh, Ds:							
Dundee	2w	Moderate	Slight	Moderate	Nuttall oak	---	Eastern cottonwood, sweetgum, water oak.
					Sugarberry	---	
					Sweetgum	100	
					Water oak	95	
					Willow oak	---	
Alligator	2w	Severe	Moderate	Moderate	Eastern cottonwood	95	Eastern cottonwood, sweetgum, American sycamore.
					Green ash	80	
					Water oak	90	
					Sweetgum	90	
Tensas	2w	Severe	Moderate	Moderate	Green ash	80	Eastern cottonwood, American sycamore.
					Eastern cottonwood	105	
					Water oak	95	
					Sweetgum	100	
					Pecan	---	
Fa	4w	Severe	Severe	Slight	Baldcypress	---	Baldcypress.
Fausse					Water hickory	---	
					Water tupelo	---	
					Black willow	---	
					Green ash	70	
La	2w	Moderate	Moderate	Moderate	Green ash	80	Eastern cottonwood, American sycamore.
Latanier					Pecan	---	
					Sweetgum	90	
					Sugarberry	---	
Ne	2w	Moderate	Slight	Moderate	Green ash	75	Eastern cottonwood, American sycamore.
Newellton					Eastern cottonwood	100	
					Nuttall oak	85	
					Water oak	90	
					Sweetgum	95	
					Pecan	---	
					Sugarberry	---	

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns			Potential productivity		Trees to plant
		Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	
NS: Newellton	3w	Moderate	Slight	Moderate	Green ash	75	Eastern cottonwood, American sycamore.
					Eastern cottonwood	100	
					Nuttall oak	85	
					Water oak	90	
					Sweetgum	95	
					Pecan	---	
					Sugarberry	---	
Sharkey	3w	Severe	Severe	Moderate	Water hickory	---	Baldcypress.
					Overcup oak	---	
					Baldcypress	---	
					Black willow	---	
					Sugarberry	---	
Nw Norwood	1o	Slight	Slight	Severe	Eastern cottonwood	100	Eastern cottonwood, American sycamore.
					Sugarberry	---	
					American sycamore	---	
Sa, Sh Sharkey	2w	Severe	Moderate	Moderate	Green ash	85	Eastern cottonwood, American sycamore, sweetgum.
					Sweetgum	90	
					Water oak	---	
					Pecan	---	
					Sugarberry	---	
					Nuttall oak	---	
Sk, Sm Sharkey	2w	Severe	Severe	Moderate	Nuttall oak	---	Eastern cottonwood, American sycamore.
					Sugarberry	---	
					Water hickory	---	
					Green ash	---	
					Overcup oak	---	
So Sharkey	3w	Severe	Severe	Moderate	Water hickory	---	Baldcypress.
					Overcup oak	---	
					Baldcypress	---	
					Black willow	---	
Sr Sharkey	2w	Severe	Severe	Moderate	Nuttall oak	---	Eastern cottonwood, American sycamore.
					Sugarberry	---	
					Water hickory	---	
					Green ash	---	
					Overcup oak	---	
SS: Sostien	2w	Severe	Moderate	Moderate	Eastern cottonwood	---	Eastern cottonwood, American sycamore.
					Sugarberry	---	
					Black willow	---	
					Nuttall oak	---	
Cocodrie	1w	Slight	Slight	Moderate	Eastern cottonwood	105	Eastern cottonwood, American sycamore.
					American sycamore	---	
					Sugarberry	---	
					Green ash	---	
					Boxelder	---	
ST: Sostien	2w	Severe	Moderate	Moderate	Eastern cottonwood	---	Eastern cottonwood, American sycamore.
					Sugarberry	---	
					Black willow	---	
					Nuttall oak	---	

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns			Potential productivity		Trees to plant
		Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	
ST: Crevasse	2s	Moderate	Severe	Slight	Sweetgum	90	Eastern cottonwood, American sycamore.
					Eastern cottonwood	100	
					American sycamore	---	
Tc Tensas	2w	Severe	Moderate	Moderate	Green ash	80	Eastern cottonwood, American sycamore.
					Nuttall oak	---	
					Water oak	95	
					Sweetgum	100	
					Pecan	---	
					Sugarberry	---	
Te Tensas	2w	Severe	Severe	Moderate	Green ash	70	Eastern cottonwood, baldcypress.
					Nuttall oak	80	
					Sugarberry	---	
To: Tensas	2w	Severe	Moderate	Moderate	Nuttall oak	---	Eastern cottonwood, American sycamore.
					Green ash	80	
					Water oak	95	
					Sweetgum	100	
					Pecan	---	
					Sugarberry	---	
Alligator	2w	Severe	Moderate	Moderate	Green ash	80	Eastern cottonwood, sweetgum, American sycamore.
					Sweetgum	90	
					Sugarberry	---	
					Overcup oak	---	
Tr: Tensas	2w	Severe	Severe	Moderate	Sweetgum	---	Eastern cottonwood, sweetgum, American sycamore.
					Sugarberry	---	
					Green ash	70	
					Nuttall oak	80	
Alligator	2w	Severe	Severe	Moderate	Sugarberry	---	Eastern cottonwood, baldcypress.
					Green ash	80	
					Overcup oak	---	
					Water hickory	---	
Ts, Tt Tunica	2w	Severe	Moderate	Moderate	Green ash	100	Eastern cottonwood, sweetgum, American sycamore.
					Nuttall oak	105	
					Sweetgum	90	
					Sugarberry	---	
					Overcup oak	---	
Tu: Tunica	2w	Severe	Moderate	Moderate	Green ash	100	Eastern cottonwood, sweetgum, American sycamore.
					Nuttall oak	105	
					Sweetgum	90	
					Sugarberry	---	
Sharkey	2w	Severe	Moderate	Moderate	Green ash	85	Eastern cottonwood, American sycamore.
					Sugarberry	---	
Ty: Tunica	2w	Severe	Moderate	Moderate	Green ash	100	Eastern cottonwood, sweetgum, American sycamore.
					Nuttall oak	105	
					Sweetgum	90	
					Sugarberry	---	

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns			Potential productivity		Trees to plant
		Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	
Ty: Sharkey	2w	Severe	Severe	Moderate	Green ash Sugarberry Overcup oak Water hickory	--- --- --- ---	Eastern cottonwood.

TABLE 9.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The flooding limitation in this table is based on yearly flooding]

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Aa, Ab, Ac----------- Alligator	Severe: flooding, wetness, percs slowly.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey, wetness.	Severe: wetness, too clayey.	Severe: wetness, too clayey.
Ba------------------ Baldwin	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
Bn, Br-------------- Bruin	Slight---------	Slight---------	Slight---------	Slight---------	Slight.
Bu------------------ Bruin	Severe: flooding.	Slight---------	Moderate: flooding.	Slight---------	Moderate: flooding.
Bw:					
Bruin---------------	Slight---------	Slight---------	Slight---------	Slight---------	Slight.
Tunica--------------	Severe: flooding, percs slowly, too clayey.	Severe: too clayey, percs slowly.	Severe: percs slowly, too clayey.	Severe: too clayey.	Severe: too clayey.
Ca, Cb-------------- Commerce	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
Cc------------------ Commerce	Severe: flooding.	Moderate: wetness, percs slowly.	Moderate: wetness, flooding.	Moderate: wetness.	Moderate: wetness, flooding.
Cm------------------ Commerce	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
Co------------------ Commerce	Severe: flooding.	Moderate: wetness, percs slowly.	Moderate: wetness, flooding.	Moderate: wetness.	Moderate: wetness, flooding.
CR:					
Commerce------------	Severe: flooding.	Moderate: flooding, wetness, percs slowly.	Severe: flooding.	Moderate: wetness, flooding.	Severe: flooding.
Bruin---------------	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
Cv------------------ Crevasse	Severe: flooding, too sandy.	Severe: too sandy.	Severe: too sandy, flooding.	Severe: too sandy.	Severe: droughty, flooding.
Dd, De-------------- Dundee	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Dh:					
Dundee	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
Alligator	Severe: flooding, wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Tensas	Severe: wetness, percs slowly.	Severe: too clayey, percs slowly.	Severe: too clayey, wetness.	Severe: too clayey.	Severe: too clayey.
Ds:					
Dundee	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness.	Moderate: wetness.	Moderate: wetness.
Alligator	Severe: flooding, wetness, percs slowly.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey, wetness.	Severe: wetness, too clayey.	Severe: wetness, too clayey.
Tensas	Severe: wetness, percs slowly.	Severe: too clayey, percs slowly.	Severe: too clayey, wetness.	Severe: too clayey.	Severe: too clayey.
Fa Fausse	Severe: flooding, ponding, percs slowly.	Severe: ponding, too clayey, excess humus.	Severe: too clayey, excess humus, ponding.	Severe: ponding, too clayey, excess humus.	Severe: ponding, flooding, too clayey.
La Latanier	Severe: flooding, wetness, percs slowly.	Severe: too clayey, percs slowly.	Severe: too clayey, wetness.	Severe: too clayey.	Severe: too clayey.
Ne Newellton	Severe: too clayey, wetness.	Severe: too clayey.	Severe: too clayey, wetness.	Severe: too clayey.	Severe: too clayey.
NS:					
Newellton	Severe: flooding, wetness, too clayey.	Severe: too clayey.	Severe: too clayey, flooding, wetness.	Severe: too clayey.	Severe: flooding, too clayey.
Sharkey	Severe: flooding, wetness, percs slowly.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey, wetness, flooding.	Severe: wetness, too clayey.	Severe: wetness, flooding, too clayey.
Nw Norwood	Severe: flooding.	Slight	Moderate: flooding, slope.	Slight	Moderate: flooding.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Sa Sharkey	Severe: flooding, wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Sh, Sk, Sm Sharkey	Severe: flooding, wetness, percs slowly.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey, wetness.	Severe: wetness, too clayey.	Severe: wetness, too clayey.
So Sharkey	Severe: flooding, wetness, percs slowly.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey, wetness, flooding.	Severe: wetness, too clayey.	Severe: wetness, flooding, too clayey.
Sr Sharkey	Severe: flooding, wetness, percs slowly.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey, wetness.	Severe: wetness, too clayey.	Severe: wetness, too clayey.
SS: Sostien	Severe: flooding, wetness, percs slowly.	Severe: wetness, too clayey, percs slowly.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey, wetness.	Severe: wetness, too clayey.
Cocodrie	Severe: flooding.	Moderate: wetness.	Moderate: flooding, wetness.	Slight	Moderate: flooding.
ST: Sostien	Severe: flooding, wetness, percs slowly.	Severe: wetness, too clayey, percs slowly.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey, wetness.	Severe: wetness, too clayey.
Crevasse	Severe: flooding, too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
Tc, Te Tensas	Severe: flooding, wetness, percs slowly.	Severe: too clayey, percs slowly.	Severe: too clayey, wetness.	Severe: too clayey.	Severe: too clayey.
To: Tensas	Severe: wetness, percs slowly.	Severe: too clayey, percs slowly.	Severe: too clayey, wetness.	Severe: too clayey.	Severe: too clayey.
Alligator	Severe: flooding, wetness, percs slowly.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey, wetness.	Severe: wetness, too clayey.	Severe: wetness, too clayey.
Tr: Tensas	Severe: flooding, wetness, percs slowly.	Severe: too clayey, percs slowly.	Severe: too clayey, wetness.	Severe: too clayey.	Severe: too clayey.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Tr:					
Alligator------------	Severe: flooding, wetness, percs slowly.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey, wetness.	Severe: wetness, too clayey.	Severe: wetness, too clayey.
Ts------------------- Tunica	Severe: flooding, percs slowly, too clayey.	Severe: too clayey, percs slowly.	Severe: percs slowly, too clayey.	Severe: too clayey.	Severe: too clayey.
Tt-------------------- Tunica	Severe: flooding, percs slowly, too clayey.	Severe: too clayey, percs slowly.	Severe: too clayey, percs slowly.	Severe: too clayey.	Severe: too clayey.
Tu:					
Tunica---------------	Severe: percs slowly, too clayey.	Severe: too clayey, percs slowly.	Severe: percs slowly, too clayey.	Severe: too clayey.	Severe: too clayey.
Sharkey--------------	Severe: flooding, wetness, percs slowly.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey, wetness.	Severe: wetness, too clayey.	Severe: wetness, too clayey.
Ty:					
Tunica---------------	Severe: flooding, percs slowly, too clayey.	Severe: too clayey, percs slowly.	Severe: too clayey, percs slowly.	Severe: too clayey.	Severe: too clayey.
Sharkey--------------	Severe: flooding, wetness, percs slowly.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey, wetness.	Severe: wetness, too clayey.	Severe: wetness, too clayey.

TABLE 10.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Aa, Ab, Ac Alligator	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
Ba Baldwin	Fair	Fair	Fair	Good	Good	Good	Good	Fair	Good	Good.
Bn, Br Bruin	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Bu Bruin	Fair	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Bw:										
Bruin	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Tunica	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
Ca Commerce	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Cb Commerce	Good	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
Cc Commerce	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Cm Commerce	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Co Commerce	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
CR:										
Commerce	Poor	Fair	Fair	Good	Fair	Fair	Fair	Fair	Good	Fair.
Bruin	Poor	Fair	Fair	Good	Good	Poor	Poor	Fair	Good	Poor.
Cv Crevasse	Poor	Poor	Fair	Poor	Fair	Poor	Very poor.	Poor	Poor	Very poor.
Dd, De Dundee	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Dh, Ds:										
Dundee	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Alligator	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
Tensas	Fair	Fair	Fair	Good	Good	Poor	Very poor.	Fair	Good	Fair.
Fa Fausse	Very poor.	Very poor.	Very poor.	Poor	Poor	Good	Good	Very poor.	Poor	Good.
La Latanier	Fair	Fair	Fair	Good	Good	Good	Good	Fair	Good	Good.

TABLE 10.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba-ceous plants	Hardwood trees	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife life
Ne----------------- Newellton	Fair	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
NS:										
Newellton----------	Poor	Fair	Fair	Fair	Poor	Fair	Fair	Poor	Fair	Fair.
Sharkey------------	Poor	Poor	Fair	Good	Poor	Fair	Fair	Poor	Fair	Fair.
Nw----------------- Norwood	Good	Good	Fair	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Sa, Sh------------- Sharkey	Fair	Fair	Fair	Good	Good	Good	Good	Fair	Good	Good.
Sk, Sm------------- Sharkey	Fair	Fair	Fair	Good	Good	Good	Good	Fair	Good	Good.
So----------------- Sharkey	Poor	Poor	Fair	Good	Poor	Fair	Fair	Poor	Fair	Fair.
Sr----------------- Sharkey	Fair	Fair	Fair	Good	Good	Good	Good	Fair	Good	Good.
SS:										
Sostien------------	Fair	Fair	Fair	Good	Good	Good	Poor	Fair	Good	Fair.
Cocodrie-----------	Fair	Good	Good	Good	Good	Poor	Poor	Good	Good	Fair.
ST:										
Sostien------------	Fair	Fair	Fair	Good	Good	Good	Poor	Fair	Good	Fair.
Crevasse-----------	Poor	Fair	Fair	Poor	Fair	Poor	Very poor.	Fair	Poor	Very poor.
Tc----------------- Tensas	Fair	Fair	Fair	Good	Good	Good	Good	Fair	Good	Good.
Te----------------- Tensas	Fair	Fair	Fair	Good	Good	Good	Good	Poor	Good	Good.
To:										
Tensas-------------	Fair	Fair	Fair	Good	Good	Poor	Very poor.	Fair	Good	Fair.
Alligator----------	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
Tr:										
Tensas-------------	Fair	Fair	Fair	Good	Good	Good	Good	Poor	Good	Good.
Alligator----------	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
Ts----------------- Tunica	Fair	Fair	Fair	Fair	Good	Good	Good	Fair	Fair	Good.
Tt----------------- Tunica	Fair	Fair	Fair	Fair	Good	Good	Good	Fair	Fair	Good.

TABLE 10.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Tu:										
Tunica	Fair	Fair	Fair	Fair	Good	Good	Good	Fair	Fair	Good.
Sharkey	Fair	Fair	Fair	Good	Good	Good	Poor	Fair	Good	Fair.
Ty:										
Tunica	Fair	Fair	Fair	Fair	Good	Good	Good	Fair	Fair	Good.
Sharkey	Fair	Fair	Fair	Good	Good	Good	Good	Fair	Good	Good.

TABLE 11.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The flooding limitation in this table is based on yearly flooding]

Map symbol and soil name	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Aa Alligator	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strengtb, wetness, shrink-swell.	Severe: wetness, too clayey.
Ab, Ac Alligator	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, wetness, flooding, shrink-swell.	Severe: wetness, too clayey.
Ba Baldwin	Severe: wetness.	Severe: wetness, shrink-swell, flooding.	Severe: wetness, shrink-swell, flooding.	Severe: low strength, wetness, shrink-swell.	Severe: wetness.
Bn, Br Bruin	Slight	Slight	Slight	Slight	Slight.
Bu Bruin	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
Bw: Bruin	Slight	Slight	Slight	Slight	Slight.
Tunica	Severe: wetness.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: low strength, shrink-swell.	Severe: too clayey.
Ca, Cb Commerce	Severe: wetness.	Moderate: wetness, shrink-swell.	Moderate: wetness, shrink-swell.	Severe: low strength.	Moderate: wetness.
Cc Commerce	Severe: wetness.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding.	Moderate: wetness, flooding.
Cm Commerce	Severe: wetness.	Moderate: wetness, shrink-swell.	Moderate: wetness, shrink-swell.	Severe: low strength.	Moderate: wetness.
Co Commerce	Severe: wetness.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding.	Moderate: wetness, flooding.
CR: Commerce	Severe: wetness.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding.	Severe: flooding.
Bruin	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
Cv Crevasse	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: droughty, flooding.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Dd, De: Dundee	Severe: wetness.	Moderate: wetness, shrink-swell.	Moderate: wetness, shrink-swell.	Severe: low strength.	Moderate: wetness.
Dh:					
Dundee	Severe: wetness.	Moderate: wetness, shrink-swell.	Moderate: wetness, shrink-swell.	Severe: low strength.	Moderate: wetness.
Alligator	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, wetness.	Severe: wetness.
Tensas	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: low strength.	Severe: too clayey.
Ds:					
Dundee	Severe: wetness.	Moderate: wetness, shrink-swell.	Moderate: wetness, shrink-swell.	Severe: low strength.	Moderate: wetness.
Alligator	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, wetness.	Severe: wetness, too clayey.
Tensas	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: low strength.	Severe: too clayey.
Fa: Fausse	Severe: ponding.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: low strength, ponding, flooding.	Severe: ponding, flooding, too clayey.
La: Latanier	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, flooding, shrink-swell.	Severe: too clayey.
Ne: Newellton	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: low strength.	Severe: too clayey.
NS:					
Newellton	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, low strength.	Severe: flooding, too clayey.
Sharkey	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding, too clayey.
Nw: Norwood	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding.	Moderate: flooding.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Sa Sharkey	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, wetness.	Severe: wetness.
Sh Sharkey	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, wetness.	Severe: wetness, too clayey.
Sk, Sm Sharkey	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, wetness, flooding.	Severe: wetness, too clayey.
So Sharkey	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding, too clayey.
Sr Sharkey	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, wetness, flooding.	Severe: wetness, too clayey.
SS: Sostien	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, low strength, wetness.	Severe: wetness, too clayey.
Cocodrie	Severe: wetness.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
ST: Sostien	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, wetness.	Severe: wetness, too clayey.
Crevasse	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Severe: droughty.
Tc Tensas	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength.	Severe: too clayey.
Te Tensas	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, flooding.	Severe: too clayey.
To: Tensas	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength.	Severe: too clayey.
Alligator	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, wetness.	Severe: wetness, too clayey.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Tr:					
Tensas	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, flooding.	Severe: too clayey.
Alligator	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, wetness, flooding.	Severe: wetness, too clayey.
Ts Tunica	Severe: wetness.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: low strength, shrink-swell.	Severe: too clayey.
Tt Tunica	Severe: wetness.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: low strength, flooding, shrink-swell.	Severe: too clayey.
Tu:					
Tunica	Severe: wetness.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Severe: too clayey.
Sharkey	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, wetness.	Severe: wetness, too clayey.
Ty:					
Tunica	Severe: wetness.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: low strength, flooding, shrink-swell.	Severe: too clayey.
Sharkey	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, wetness, flooding.	Severe: wetness, too clayey.

TABLE 12.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The flooding limitation in this table is based on yearly flooding]

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Aa------------------ Alligator	Severe: wetness, percs slowly.	Severe: flooding, wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Ab, Ac-------------- Alligator	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
Ba------------------ Baldwin	Severe: wetness, percs slowly.	Severe: wetness, flooding.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Bn, Br-------------- Bruin	Moderate: percs slowly.	Moderate: seepage.	Slight-----------	Slight-----------	Good.
Bu------------------ Bruin	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Good.
Bw: Bruin---------------	Moderate: percs slowly.	Moderate: seepage.	Slight-----------	Slight-----------	Good.
Tunica-------------	Severe: wetness, percs slowly.	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
Ca, Cb-------------- Commerce	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
Cc------------------ Commerce	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness.
Cm------------------ Commerce	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
Co------------------ Commerce	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness.
CR: Commerce-----------	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness.
Bruin--------------	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Good.

TABLE 12.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Cv------------------- Crevasse	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage.	Poor: seepage, too sandy.
Dd, De-------------- Dundee	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
Dh, Ds:					
Dundee-------------	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
Alligator----------	Severe: wetness, percs slowly.	Severe: flooding, wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Tensas-------------	Severe: wetness, percs slowly.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Fa------------------ Fausse	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding, too clayey.	Severe: flooding, ponding.	Poor: too clayey, hard to pack, ponding.
La------------------ Latanier	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
Ne------------------ Newellton	Severe: wetness, percs slowly.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness.	Poor: wetness.
NS:					
Newellton----------	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
Sharkey------------	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
Nw------------------ Norwood	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Fair: too clayey.
Sa, Sh-------------- Sharkey	Severe: wetness, percs slowly.	Severe: flooding, wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Sk, Sm, So, Sr------ Sharkey	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.

TABLE 12.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
SS: Sostien	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
Cocodrie	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness.
ST: Sostien	Severe: wetness, percs slowly.	Severe: flooding, wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Crevasse	Severe: wetness, poor filter.	Severe: seepage, flooding.	Severe: seepage, wetness.	Severe: seepage.	Poor: seepage, too sandy.
Tc Tensas	Severe: wetness, percs slowly.	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Te Tensas	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
To: Tensas	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Alligator	Severe: wetness, percs slowly.	Severe: flooding, wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Tr: Tensas	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
Alligator	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
Ts Tunica	Severe: wetness, percs slowly.	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
Tt Tunica	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness.

TABLE 12.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Tu:					
Tunica-------------	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
Sharkey------------	Severe: wetness, percs slowly.	Severe: flooding, wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Ty:					
Tunica-------------	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness.
Sharkey------------	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.

TABLE 13.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms]

Map symbol and soil name	Roadfill	Topsoil
Aa, Ab, Ac------- Alligator	Poor: low strength, wetness, shrink-swell.	Poor: too clayey, wetness.
Ba--------------- Baldwin	Poor: low strength, wetness, shrink-swell.	Poor: thin layer, wetness.
Bn, Br, Bu------- Bruin	Fair: low strength.	Good.
Bw:		
Bruin-----------	Fair: low strength.	Good.
Tunica----------	Poor: low strength.	Poor: too clayey.
Ca, Cb, Cc------- Commerce	Poor: low strength.	Good.
Cm, Co----------- Commerce	Poor: low strength.	Fair: too clayey.
CR:		
Commerce--------	Poor: low strength.	Fair: too clayey.
Bruin-----------	Fair: low strength.	Good.
Cv--------------- Crevasse	Good-------------	Fair: too sandy.
Dd, De----------- Dundee	Fair: wetness.	Good.
Dh:		
Dundee----------	Fair: wetness.	Good.
Alligator-------	Poor: low strength, wetness, shrink-swell.	Poor: wetness, too clayey.
Tensas----------	Poor: low strength.	Poor: too clayey.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Topsoil
Ds:		
Dundee	Fair: wetness.	Good.
Alligator	Poor: low strength, wetness, shrink-swell.	Poor: too clayey, wetness.
Tensas	Poor: low strength.	Poor: too clayey.
Fa Fausse	Poor: low strength, wetness, shrink-swell.	Poor: too clayey, wetness.
La Latanier	Poor: low strength.	Poor: too clayey.
Ne Newellton	Poor: low strength.	Poor: too clayey.
NS:		
Newellton	Poor: low strength.	Poor: too clayey.
Sharkey	Poor: low strength, wetness, shrink-swell.	Poor: too clayey, wetness.
Nw Norwood	Poor: low strength.	Good.
Sa Sharkey	Poor: low strength, wetness, shrink-swell.	Poor: wetness, thin layer.
Sh, Sk, Sm, So, Sr Sharkey	Poor: low strength, wetness, shrink-swell.	Poor: too clayey, wetness.
SS:		
Sostien	Poor: low strength, wetness, shrink-swell.	Poor: too clayey, wetness.
Cocodrie	Fair: wetness.	Good.
ST:		
Sostien	Poor: low strength, wetness, shrink-swell.	Poor: too clayey, wetness.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Topsoil
ST:		
Crevasse	Good	Fair: too sandy.
Tc, Te Tensas	Poor: low strength.	Poor: too clayey.
To, Tr:		
Tensas	Poor: low strength.	Poor: too clayey.
Alligator	Poor: low strength, wetness, shrink-swell.	Poor: too clayey, wetness.
Ts, Tt Tunica	Poor: low strength.	Poor: too clayey.
Tu, Ty:		
Tunica	Poor: low strength.	Poor: too clayey.
Sharkey	Poor: low strength, wetness, shrink-swell.	Poor: too clayey, wetness.

TABLE 14.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The flooding limitation in this table is based on yearly flooding]

Map symbol and soil name	Limitations for--		Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Grassed waterways
Aa Alligator	Slight	Severe: hard to pack, wetness.	Percs slowly	Wetness, slow intake, percs slowly.	Wetness, percs slowly.
Ab, Ac Alligator	Slight	Severe: hard to pack, wetness.	Percs slowly, flooding.	Wetness, flooding, slow intake, percs slowly.	Wetness, percs slowly.
Ba Baldwin	Slight	Severe: wetness.	Percs slowly	Wetness, percs slowly, erodes easily.	Wetness, erodes easily, percs slowly.
Bn, Br Bruin	Moderate: seepage.	Severe: piping.	Deep to water	Erodes easily	Erodes easily.
Bu Bruin	Moderate: seepage.	Severe: piping.	Deep to water	Flooding, erodes easily.	Erodes easily.
Bw:					
Bruin	Moderate: seepage.	Severe: piping.	Deep to water	Erodes easily	Erodes easily.
Tunica	Moderate: seepage.	Severe: piping, wetness.	Percs slowly	Wetness, slow intake, percs slowly.	Percs slowly.
Ca, Cb Commerce	Moderate: seepage.	Severe: wetness.	Favorable	Wetness, erodes easily.	Erodes easily.
Cc Commerce	Moderate: seepage.	Severe: wetness.	Flooding	Wetness, flooding, erodes easily.	Erodes easily.
Cm Commerce	Moderate: seepage.	Severe: wetness.	Favorable	Wetness, erodes easily.	Erodes easily.
Co Commerce	Moderate: seepage.	Severe: wetness	Flooding	Wetness, flooding, erodes easily.	Erodes easily.
CR:					
Commerce	Moderate: seepage.	Severe: wetness.	Flooding	Wetness, flooding, erodes easily.	Erodes easily.
Bruin	Moderate: seepage.	Severe: piping.	Deep to water	Flooding, erodes easily.	Erodes easily.
Cv Crevasse	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, flooding, fast intake.	Droughty.

TABLE 14.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--		Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Grassed waterways
Dd, De: Dundee	Moderate: seepage.	Severe: piping, wetness.	Favorable	Wetness, erodes easily.	Erodes easily.
Dh:					
Dundee	Moderate: seepage.	Severe: piping, wetness.	Favorable	Wetness, erodes easily.	Erodes easily.
Alligator	Slight	Severe: hard to pack, wetness.	Percs slowly	Wetness, percs slowly.	Wetness, percs slowly.
Tensas	Moderate: seepage.	Severe: piping, wetness.	Percs slowly	Wetness, slow intake, percs slowly.	Wetness, percs slowly.
Ds:					
Dundee	Moderate: seepage.	Severe: piping, wetness.	Favorable	Wetness	Erodes easily.
Alligator	Slight	Severe: hard to pack, wetness.	Percs slowly	Wetness, slow intake, percs slowly.	Wetness, percs slowly.
Tensas	Moderate: seepage.	Severe: piping, wetness.	Percs slowly	Wetness, slow intake, percs slowly.	Wetness, percs slowly.
Fa: Fausse	Slight	Severe: hard to pack, ponding.	Ponding, percs slowly, flooding.	Ponding, flooding, slow intake, percs slowly.	Wetness, percs slowly.
La: Latanier	Moderate: seepage.	Severe: piping, wetness.	Percs slowly, flooding.	Wetness, flooding, slow intake, percs slowly.	Wetness, percs slowly.
Ne: Newellton	Slight	Severe: wetness.	Percs slowly	Percs slowly, slow intake.	Wetness, percs slowly.
NS:					
Newellton	Slight	Severe: wetness.	Flooding, percs slowly.	Flooding, percs slowly.	Wetness, percs slowly.
Sharkey	Slight	Severe: hard to pack, wetness.	Percs slowly, flooding.	Wetness, flooding, slow intake, percs slowly.	Wetness, rooting depth.
Nw: Norwood	Moderate: seepage.	Severe: piping.	Deep to water	Erodes easily, flooding.	Erodes easily.
Sa: Sharkey	Slight	Severe: hard to pack, wetness.	Percs slowly	Wetness, percs slowly.	Wetness, erodes easily, percs slowly.

TABLE 14.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--		Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Grassed waterways
Sh Sharkey	Slight	Severe: hard to pack, wetness.	Percs slowly	Wetness, slow intake, percs slowly.	Wetness, percs slowly.
Sk, Sm, So, Sr Sharkey	Slight	Severe: hard to pack, wetness.	Percs slowly, flooding.	Wetness, flooding, slow intake, percs slowly.	Wetness.
SS: Sostien	Slight	Severe: hard to pack, wetness.	Percs slowly, flooding.	Wetness, flooding, percs slowly.	Wetness, percs slowly.
Cocodrie	Moderate: seepage.	Severe: piping.	Flooding	Flooding, erodes easily.	Erodes easily.
ST: Sostien	Slight	Severe: hard to pack, wetness.	Percs slowly	Wetness, percs slowly.	Wetness, percs slowly.
Crevasse	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake.	Droughty.
Tc Tensas	Moderate: seepage.	Severe: piping, wetness.	Percs slowly	Wetness, slow intake, percs slowly.	Wetness, percs slowly.
Te Tensas	Moderate: seepage.	Severe: piping, wetness.	Percs slowly, flooding.	Wetness, flooding, slow intake, percs slowly.	Wetness, percs slowly.
To: Tensas	Moderate: seepage.	Severe: piping, wetness.	Percs slowly	Wetness, slow intake, percs slowly.	Wetness, percs slowly.
Alligator	Slight	Severe: hard to pack, wetness.	Percs slowly	Wetness, slow intake, percs slowly.	Wetness, percs slowly.
Tr: Tensas	Moderate: seepage.	Severe: piping, wetness.	Percs slowly, flooding.	Wetness, flooding, slow intake, percs slowly.	Wetness, erodes easily, percs slowly.
Alligator	Slight	Severe: hard to pack, wetness.	Percs slowly, flooding.	Wetness, flooding, slow intake, percs slowly.	Wetness, percs slowly.
Ts Tunica	Moderate: seepage.	Severe: piping, wetness.	Percs slowly	Wetness, slow intake, percs slowly.	Percs slowly.
Tt Tunica	Moderate: seepage.	Severe: piping, wetness.	Percs slowly, flooding.	Wetness, flooding, slow intake, percs slowly.	Percs slowly.

TABLE 14.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--		Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Grassed waterways
Tu:					
Tunica-----------	Moderate: seepage.	Severe: piping, wetness.	Percs slowly-----	Wetness, slow intake, percs slowly.	Percs slowly.
Sharkey----------	Slight------------	Severe: hard to pack, wetness.	Percs slowly-----	Wetness, slow intake, percs slowly.	Wetness, percs slowly.
Ty:					
Tunica-----------	Moderate: seepage.	Severe: piping, wetness.	Percs slowly, flooding.	Wetness, flooding, slow intake, percs slowly.	Percs slowly.
Sharkey----------	Slight------------	Severe: hard to pack, wetness.	Percs slowly, flooding.	Wetness, flooding, slow intake, percs slowly.	Wetness, percs slowly.

TABLE 15.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated. Some symbols may have Unified classifications and USDA textures in addition to those shown. In general, the dominant classifications and textures are shown]

Map symbol and soil name	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Aa	0-5	Clay	CH	A-7	0	100	100	95-100	95-100	52-75	30-50
Alligator	5-40	Silty clay, clay	CH	A-7	0	100	100	100	95-100	62-94	33-64
	40-65	Silty clay loam, silty clay, clay.	CH	A-7	0	100	100	100	95-100	62-94	33-64
Ab	0-5	Clay	CH	A-7	0	100	100	95-100	95-100	52-75	30-50
Alligator	5-41	Silty clay, clay	CH	A-7	0	100	100	100	95-100	62-94	33-64
	41-60	Silty clay loam, silty clay, clay.	CH	A-7	0	100	100	100	95-100	62-94	33-64
Ac	0-7	Clay	CH	A-7	0	100	100	95-100	95-100	52-75	30-50
Alligator	7-42	Silty clay, clay	CH	A-7	0	100	100	100	95-100	62-94	33-64
	42-60	Silty clay loam, silty clay, clay.	CH	A-7	0	100	100	100	95-100	62-94	33-64
Ba Baldwin	0-7	Silty clay loam	CL, CH	A-7-6, A-6	0	100	100	100	95-100	35-55	15-28
	7-28	Clay, silty clay	CH	A-7-6	0	95-100	95-100	95-100	90-100	51-75	25-45
	28-71	Clay, silty clay, silty clay loam.	CH, CL	A-7-6, A-6	0	95-100	95-100	95-100	90-100	35-65	15-35
Bn	0-7	Silt loam	ML, CL-ML	A-4	0	100	100	95-100	80-100	<27	NP-7
Bruin	7-31	Silt loam, loam, very fine sandy loam.	ML, CL-ML, CL	A-4	0	100	100	95-100	80-100	<32	NP-10
	31-65	Variable	---	---	---	---	---	---	---	---	---
Br	0-4	Silt loam	ML, CL-ML	A-4	0	100	100	95-100	80-100	<27	NP-7
Bruin	4-26	Silt loam, loam, very fine sandy loam.	ML, CL-ML, CL	A-4	0	100	100	95-100	80-100	<32	NP-10
	26-60	Variable	---	---	---	---	---	---	---	---	---
Bu	0-8	Silt loam	ML, CL-ML	A-4	0	100	100	95-100	80-100	<27	NP-7
Bruin	8-36	Silt loam, loam, very fine sandy loam.	ML, CL-ML, CL	A-4	0	100	100	95-100	80-100	<32	NP-10
	36-75	Variable	---	---	---	---	---	---	---	---	---
Bw:											
Bruin	0-6	Silt loam	ML, CL-ML	A-4	0	100	100	95-100	80-100	<27	NP-7
	6-43	Silt loam, loam, very fine sandy loam.	ML, CL-ML, CL	A-4	0	100	100	95-100	80-100	<32	NP-10
	43-60	Variable	---	---	---	---	---	---	---	---	---
Tunica	0-5	Clay	CH	A-7	0	100	98-100	95-100	90-100	50-92	25-62
	5-30	Clay, silty clay	CH	A-7	0	100	98-100	95-100	90-100	50-92	25-62
	30-60	Silt loam, silty clay loam.	ML, CL-ML, CL	A-4, A-6	0	100	95-100	65-100	51-100	<40	NP-20

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Ca--------------- Commerce	0-5	Silt loam---------	CL-ML, CL, ML	A-4	0	100	100	100	75-100	<30	NP-10
	5-28	Silty clay loam, silt loam, loam.	CL	A-6, A-7-6	0	100	100	100	85-100	32-45	11-23
	28-60	Stratified very fine sandy loam to silty clay.	CL-ML, CL, ML	A-4, A-6, A-7-6	0	100	100	100	75-100	23-45	3-23
Cb--------------- Commerce	0-5	Silt loam---------	CL-ML, CL, ML	A-4	0	100	100	100	75-100	<30	NP-10
	5-35	Silty clay loam, silt loam, loam.	CL	A-6, A-7-6	0	100	100	100	85-100	32-45	11-23
	35-75	Stratified very fine sandy loam to silty clay.	CL-ML, CL, ML	A-4, A-6, A-7-6	0	100	100	100	75-100	23-45	3-23
Cc--------------- Commerce	0-5	Silt loam---------	CL-ML, CL, ML	A-4	0	100	100	100	75-100	<30	NP-10
	5-31	Silty clay loam, silt loam, loam.	CL	A-6, A-7-6	0	100	100	100	85-100	32-45	11-23
	31-60	Stratified very fine sandy loam to silty clay.	CL-ML, CL, ML	A-4, A-6, A-7-6	0	100	100	100	75-100	23-45	3-23
Cm--------------- Commerce	0-4	Silty clay loam	CL	A-6, A-7-6	0	100	100	100	90-100	32-50	11-25
	4-33	Silty clay loam, silt loam, loam.	CL	A-6, A-7-6	0	100	100	100	85-100	32-45	11-23
	33-60	Stratified very fine sandy loam to silty clay.	CL-ML, CL, ML	A-4, A-6, A-7-6	0	100	100	100	75-100	23-45	3-23
Co--------------- Commerce	0-8	Silty clay loam	CL	A-6, A-7-6	0	100	100	100	90-100	32-50	11-25
	8-42	Silty clay loam, silt loam, loam.	CL	A-6, A-7-6	0	100	100	100	85-100	32-45	11-23
	42-60	Stratified very fine sandy loam to silty clay.	CL-ML, CL, ML	A-4, A-6, A-7-6	0	100	100	100	75-100	23-45	3-23
CR: Commerce---------	0-6	Silty clay loam	CL	A-6, A-7-6	0	100	100	100	90-100	32-50	11-25
	6-28	Silty clay loam, silt loam, loam.	CL	A-6, A-7-6	0	100	100	100	85-100	32-45	11-23
	28-60	Stratified very fine sandy loam to silty clay.	CL-ML, CL, ML	A-4, A-6, A-7-6	0	100	100	100	75-100	23-45	3-23
Bruin-----------	0-8	Very fine sandy loam.	ML, CL-ML	A-4	0	100	100	95-100	80-100	<27	NP-7
	8-32	Silt loam, loam, very fine sandy loam.	ML, CL-ML, CL	A-4	0	100	100	95-100	80-100	<32	NP-10
	32-60	Variable----------	---	---	---	---	---	---	---	---	---
Cv--------------- Crevasse	0-5	Fine sand--------	SP-SM, SM	A-2-4, A-3	0	100	95-100	50-100	5-20	---	NP
	5-65	Sand, loamy sand, fine sand.	SP-SM, SM	A-2, A-3	0	100	95-100	50-100	5-20	---	NP

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Dd------------- Dundee	0-7	Loam------------	ML, CL-ML	A-4	0	100	100	75-95	51-75	<30	NP-7
	7-27	Silty clay loam, clay loam, loam.	CL	A-6, A-7	0	100	100	90-100	70-95	28-44	12-22
	27-65	Loam, very fine sandy loam, silt loam.	CL, CL-ML, ML	A-4	0	100	100	85-100	60-90	<30	NP-8
De------------- Dundee	0-8	Silty clay loam	CL, CL-ML, ML	A-4, A-6	0	100	100	90-100	75-98	20-35	3-11
	8-36	Silty clay loam, clay loam, loam.	CL	A-6, A-7	0	100	100	90-100	70-95	28-44	12-22
	36-60	Loam, very fine sandy loam, silt loam.	CL, CL-ML, ML	A-4	0	100	100	85-100	60-90	<30	NP-8
Dh:											
Dundee----------	0-5	Loam------------	ML, CL-ML	A-4	0	100	100	75-95	51-75	<30	NP-7
	5-24	Silty clay loam, clay loam, loam.	CL	A-6, A-7	0	100	100	90-100	70-95	28-44	12-22
	24-60	Loam, very fine sandy loam, silt loam.	CL, CL-ML, ML	A-4	0	100	100	85-100	60-90	<30	NP-8
Alligator-------	0-6	Silty clay loam	CL, CH	A-6, A-7	0	100	100	100	90-100	32-54	15-30
	6-41	Silty clay, clay	CH	A-7	0	100	100	100	95-100	62-94	33-64
	41-60	Silty clay loam, silty clay, clay.	CH	A-7	0	100	100	100	95-100	62-94	33-64
Tensas----------	0-5	Silty clay-------	CH, CL	A-7-6	0	100	100	100	95-100	46-70	22-40
	5-33	Clay, silty clay	CH	A-7-6	0	100	100	100	95-100	51-75	26-45
	33-60	Very fine sandy loam, silty clay loam, silt loam.	CL-ML, CL	A-4, A-6	0	100	100	100	80-100	25-40	5-17
Ds:											
Dundee----------	0-7	Loam------------	ML, CL-ML	A-4	0	100	100	75-95	51-75	<30	NP-7
	7-22	Silty clay loam, clay loam, loam.	CL	A-6, A-7	0	100	100	90-100	70-95	28-44	12-22
	22-60	Loam, very fine sandy loam, silt loam.	CL, CL-ML, ML	A-4	0	100	100	85-100	60-90	<30	NP-8
Alligator-------	0-4	Clay------------	CH	A-7	0	100	100	95-100	95-100	52-75	30-50
	4-42	Silty clay, clay	CH	A-7	0	100	100	100	95-100	62-94	33-64
	42-60	Silty clay loam, silty clay, clay.	CH	A-7	0	100	100	100	95-100	62-94	33-64
Tensas----------	0-4	Silty clay-------	CH, CL	A-7-6	0	100	100	100	95-100	46-70	22-40
	4-26	Clay, silty clay	CH	A-7-6	0	100	100	100	95-100	51-75	26-45
	26-60	Very fine sandy loam, silty clay loam, silt loam.	CL-ML, CL	A-4, A-6	0	100	100	100	80-100	25-40	5-17

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Fa------------------ Fausse	0-12	Clay--------------	CH, OH, MH	A-7-6, A-7-5	0	100	100	100	95-100	50-100	21-71
	12-62	Clay, silty clay, silty clay loam.	CH, MH, CL ML	A-7-6, A-7-5	0	100	100	100	95-100	45-100	16-71
La------------------	0-5	Clay--------------	CH	A-7-6	0	100	100	100	95-100	51-75	26-45
	5-24	Clay, silty clay	CH	A-7-6	0	100	100	100	95-100	51-75	26-45
	24-72	Silt loam, silty clay loam, very fine sandy loam.	CL-ML, CL, ML	A-4, A-6	0	100	100	100	80-100	<40	NP-17
Ne------------------ Newellton	0-5	Clay--------------	CH, CL	A-7-6	0	100	100	100	95-100	45-65	22-35
	5-16	Clay, silty clay	CH, CL	A-7-6	0	100	100	100	95-100	45-65	22-35
	16-60	Stratified very fine sandy loam to silty clay loam.	CL, CL-ML	A-4, A-6	0	100	100	95-100	85-100	25-35	5-15
NS: Newellton--------	0-5	Clay--------------	CH, CL	A-7-6	0	100	100	100	95-100	45-65	22-35
	5-16	Clay, silty clay	CH, CL	A-7-6	0	100	100	100	95-100	45-65	22-35
	16-60	Stratified very fine sandy loam to silty clay loam.	CL, CL-ML	A-4, A-6	0	100	100	95-100	85-100	25-35	5-15
Sharkey----------	0-9	Clay--------------	CH, CL	A-7-6, A-7-5	0	100	100	100	95-100	46-85	22-50
	9-54	Clay--------------	CH	A-7-6, A-7-5	0	100	100	100	95-100	56-85	30-50
	54-60	Clay, silty clay loam, silt loam.	CL, CH	A-6, A-7-6, A-7-5	0	100	100	100	95-100	32-85	11-50
Nw------------------ Norwood	0-5	Silt loam---------	CL, CL-ML	A-4, A-6	0	100	100	95-100	51-90	20-35	4-15
	5-16	Silt loam, silty clay loam, loam.	CL	A-6, A-7, A-4	0	100	100	90-100	60-98	25-46	7-26
	16-86	Silt loam, very fine sandy loam, silty clay loam.	CL, ML, CL-ML	A-4, A-6, A-7	0	100	100	90-100	70-98	20-45	2-25
Sa------------------ Sharkey	0-8	Silt loam---------	ML, CL-ML, CL	A-4	0	100	100	100	95-100	<27	NP-10
	8-34	Clay--------------	CH	A-7-6, A-7-5	0	100	100	100	95-100	56-85	30-50
	34-60	Clay, silty clay loam, silt loam.	CL, CH	A-6, A-7-6, A-7-5	0	100	100	100	95-100	32-85	11-50
Sh------------------ Sharkey	0-11	Clay--------------	CH, CL	A-7-6, A-7-5	0	100	100	100	95-100	46-85	22-50
	11-47	Clay--------------	CH	A-7-6, A-7-5	0	100	100	100	95-100	56-85	30-50
	47-75	Clay, silty clay loam, silt loam.	CL, CH	A-6, A-7-6, A-7-5	0	100	100	100	95-100	32-85	11-50

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Sk---------------- Sharkey	0-9	Clay--------------	CH, CL	A-7-6, A-7-5	0	100	100	100	95-100	46-85	22-50
	9-38	Clay--------------	CH	A-7-6, A-7-5	0	100	100	100	95-100	56-85	30-50
	38-60	Clay, silty clay loam, silt loam.	CL, CH	A-6, A-7-6, A-7-5	0	100	100	100	95-100	32-85	11-50
Sm---------------- Sharkey	0-5	Clay--------------	CH, CL	A-7-6, A-7-5	0	100	100	100	95-100	46-85	22-50
	5-48	Clay--------------	CH	A-7-6, A-7-5	0	100	100	100	95-100	56-85	30-50
	48-60	Clay, silty clay loam, silt loam.	CL, CH	A-6, A-7-6, A-7-5	0	100	100	100	95-100	32-85	11-50
So---------------- Sharkey	0-11	Clay--------------	CH, CL	A-7-6, A-7-5	0	100	100	100	95-100	46-85	22-50
	11-41	Clay--------------	CH	A-7-6, A-7-5	0	100	100	100	95-100	56-85	30-50
	41-96	Clay, silty clay loam, silt loam.	CL, CH	A-6, A-7-6, A-7-5	0	100	100	100	95-100	32-85	11-50
Sr---------------- Sharkey	0-10	Clay--------------	CH, CL	A-7-6, A-7-5	0	100	100	100	95-100	46-85	22-50
	10-48	Clay--------------	CH	A-7-6, A-7-5	0	100	100	100	95-100	56-85	30-50
	48-65	Clay, silty clay loam, silt loam.	CL, CH	A-6, A-7-6, A-7-5	0	100	100	100	95-100	32-85	11-50
SS: Sostien----------	0-6	Clay--------------	CH	A-7-6	0	100	100	95-100	95-100	52-75	30-50
	6-60	Silty clay loam, silty clay, clay.	CH	A-7-6	0	100	100	95-100	95-100	52-75	30-50
Cocodrie---------	0-65	Very fine sandy loam.	ML, CL-ML	A-4	0	100	100	95-100	80-100	<27	NP-7
ST: Sostien----------	0-4	Clay--------------	CH	A-7-6	0	100	100	95-100	95-100	52-75	30-50
	4-65	Silty clay loam, silty clay, clay.	CH	A-7-6	0	100	100	95-100	95-100	52-75	30-50
Crevasse---------	0-4	Fine sand---------	SP-SM, SM	A-2-4, A-3	0	100	95-100	50-100	5-20	---	NP
	4-65	Sand, loamy sand, loamy fine sand.	SP-SM, SM	A-2, A-3	0	100	95-100	50-100	5-20	---	NP
Tc---------------- Tensas	0-5	Silty clay--------	CH, CL	A-7-6	0	100	100	100	95-100	46-70	22-40
	5-29	Clay, silty clay	CH	A-7-6	0	100	100	100	95-100	51-75	26-45
	29-65	Very fine sandy loam, clay loam, silt loam.	CL-ML, CL	A-4, A-6	0	100	100	100	80-100	25-40	5-17

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Te----------------- Tensas	0-4	Silty clay--------	CH, CL	A-7-6	0	100	100	100	95-100	46-70	22-40
	4-26	Clay, silty clay	CH	A-7-6	0	100	100	100	95-100	51-75	26-45
	26-64	Very fine sandy loam, clay loam, silt loam.	CL-ML, CL	A-4, A-6	0	100	100	100	80-100	25-40	5-17
To: Tensas-----------	0-5	Silty clay--------	CH, CL	A-7-6	0	100	100	100	95-100	46-70	22-40
	5-25	Clay, silty clay	CH	A-7-6	0	100	100	100	95-100	51-75	26-45
	25-60	Very fine sandy loam, silty clay loam, clay loam.	CL-ML, CL	A-4, A-6	0	100	100	100	80-100	25-40	5-17
Alligator--------	0-7	Clay--------------	CH	A-7	0	100	100	95-100	95-100	52-75	30-50
	7-43	Silty clay, clay	CH	A-7	0	100	100	100	95-100	62-94	33-64
	43-60	Silty clay loam, silty clay, clay.	CH	A-7	0	100	100	100	95-100	62-94	33-64
Tr: Tensas-----------	0-4	Silty clay--------	CH, CL	A-7-6	0	100	100	100	95-100	46-70	22-40
	4-24	Clay, silty clay	CH	A-7-6	0	100	100	100	95-100	51-75	26-45
	24-60	Very fine sandy loam, silty clay loam, loam.	CL-ML, CL	A-4, A-6	0	100	100	100	80-100	25-40	5-17
Alligator--------	0-7	Clay--------------	CH	A-7	0	100	100	95-100	95-100	52-75	30-50
	7-42	Silty clay, clay	CH	A-7	0	100	100	100	95-100	62-94	33-64
	42-60	Silty clay loam, silty clay, clay.	CH	A-7	0	100	100	100	95-100	62-94	33-64
Ts----------------- Tunica	0-6	Clay--------------	CH	A-7	0	100	98-100	95-100	90-100	50-92	25-62
	6-26	Clay, silty clay	CH	A-7	0	100	98-100	95-100	90-100	50-92	25-62
	26-80	Very fine sandy loam, silty clay loam, silt loam.	ML, CL-ML, CL	A-4, A-6	0	100	95-100	65-100	51-100	<40	NP-20
Tt----------------- Tunica	0-4	Clay--------------	CH	A-7	0	100	98-100	95-100	90-100	50-92	25-62
	4-27	Clay, silty clay	CH	A-7	0	100	98-100	95-100	90-100	50-92	25-62
	27-65	Fine sandy loam, silty clay loam, silt loam.	ML, CL-ML, CL	A-4, A-6	0	100	95-100	65-100	51-100	<40	NP-20
Tu: Tunica-----------	0-5	Clay--------------	CH	A-7	0	100	98-100	95-100	90-100	50-92	25-62
	5-26	Clay, silty clay	CH	A-7	0	100	98-100	95-100	90-100	50-92	25-62
	26-65	Very fine sandy loam, silt loam, silty clay loam.	ML, CL-ML, CL	A-4, A-6	0	100	95-100	65-100	51-100	<40	NP-20
Sharkey----------	0-4	Clay--------------	CH, CL	A-7-6, A-7-5	0	100	100	100	95-100	46-85	22-50
	4-41	Clay--------------	CH	A-7-6, A-7-5	0	100	100	100	95-100	56-85	30-50
	41-60	Clay, silty clay, silt loam.	CL, CH	A-6, A-7-6, A-7-5	0	100	100	100	95-100	32-85	11-50

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Ty:											
Tunica----------	0-6	Clay------------	CH	A-7	0	100	98-100	95-100	90-100	50-92	25-62
	6-31	Clay, silty clay	CH	A-7	0	100	98-100	95-100	90-100	50-92	25-62
	31-60	Very fine sandy loam, silt loam.	ML, CL-ML, CL	A-4, A-6	0	100	95-100	65-100	51-100	<40	NP-20
Sharkey---------	0-9	Clay------------	CH, CL	A-7-6, A-7-5	0	100	100	100	95-100	46-85	22-50
	9-52	Clay------------	CH	A-7-6, A-7-5	0	100	100	100	95-100	56-85	30-50
	52-65	Clay, silty clay, silt loam.	CL, CH	A-6, A-7-6, A-7-5	0	100	100	100	95-100	32-85	11-50

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cc	In/hr	In/in	pH				Pct
Aa	0-5	40-60	1.20-1.50	<0.06	0.18-0.20	4.5-6.0	High	0.32	5	1-3
Alligator	5-40	60-85	1.20-1.55	<0.06	0.14-0.18	4.5-5.5	Very high	0.24		
	40-65	35-85	1.20-1.55	<0.06	0.14-0.18	6.1-7.3	Very high	0.24		
Ab	0-5	40-60	1.20-1.50	<0.06	0.18-0.20	4.5-5.5	High	0.32	5	1-3
Alligator	5-41	60-85	1.20-1.55	<0.06	0.14-0.18	4.5-5.5	Very high	0.24		
	41-60	35-85	1.20-1.55	<0.06	0.14-0.18	6.1-7.3	Very high	0.24		
Ac	0-7	40-60	1.20-1.50	<0.06	0.18-0.20	4.5-5.5	High	0.32	5	1-3
Alligator	7-42	60-85	1.20-1.55	<0.06	0.14-0.18	4.5-5.5	Very high	0.24		
	42-60	35-85	1.20-1.55	<0.06	0.14-0.18	6.1-7.3	Very high	0.24		
Ba	0-7	27-39	1.35-1.65	0.06-0.2	0.18-0.22	4.5-6.5	Moderate	0.37	5	.5-4
Baldwin	7-28	40-55	1.20-1.60	<0.06	0.12-0.21	5.6-8.4	Very high	0.32		
	28-71	27-55	1.20-1.65	<0.2	0.12-0.21	6.1-8.4	High	0.32		
Bn	0-7	10-18	1.30-1.65	0.6-2.0	0.21-0.23	5.6-7.8	Low	0.43	5	.5-4
Bruin	7-31	10-18	1.30-1.70	0.6-2.0	0.18-0.23	6.1-7.8	Low	0.37		
	31-65	---	---	---	---	---	-------------	----		
Br	0-4	10-18	1.30-1.65	0.6-2.0	0.21-0.23	5.6-7.8	Low	0.43	5	.5-4
Bruin	4-26	10-18	1.30-1.70	0.6-2.0	0.18-0.23	6.1-7.8	Low	0.37		
	26-60	---	---	---	---	---	-------------	----		
Bu	0-8	10-18	1.30-1.65	0.6-2.0	0.21-0.23	5.6-7.8	Low	0.43	5	.5-4
Bruin	8-36	10-18	1.30-1.70	0.6-2.0	0.18-0.23	6.1-7.8	Low	0.37		
	36-75	---	---	---	---	---	-------------	----		
Bw:										
Bruin	0-6	10-18	1.30-1.65	0.6-2.0	0.21-0.23	5.6-7.8	Low	0.43	5	.5-4
	6-43	10-18	1.30-1.70	0.6-2.0	0.18-0.23	6.1-7.8	Low	0.37		
	43-60	---	---	---	---	---	-------------	----		
Tunica	0-5	35-75	1.20-1.55	<0.06	0.15-0.20	5.6-7.8	High	0.32	5	1-3
	5-30	35-75	1.20-1.55	<0.06	0.15-0.20	5.6-7.8	High	0.32		
	30-60	10-32	1.40-1.50	0.06-2.0	0.10-0.22	5.6-8.4	Low	0.32		
Ca	0-5	14-27	1.35-1.65	0.6-2.0	0.21-0.23	5.6-7.8	Low	0.43	5	.5-3
Commerce	5-28	14-39	1.35-1.70	0.2-0.6	0.20-0.22	6.1-8.4	Moderate	0.32		
	28-60	14-60	1.35-1.75	0.2-2.0	0.20-0.23	6.6-8.4	Low	0.37		
Cb	0-5	14-27	1.35-1.65	0.6-2.0	0.21-0.23	5.6-7.8	Low	0.43	5	.5-2
Commerce	5-35	14-39	1.35-1.70	0.2-0.6	0.20-0.22	6.1-8.4	Moderate	0.32		
	35-75	14-60	1.35-1.75	0.2-2.0	0.20-0.23	6.6-8.4	Low	0.37		
Cc	0-5	14-27	1.35-1.65	0.6-2.0	0.21-0.23	5.6-7.8	Low	0.43	5	.5-2
Commerce	5-31	14-39	1.35-1.70	0.2-0.6	0.20-0.22	6.1-8.4	Moderate	0.32		
	31-60	14-60	1.35-1.75	0.2-2.0	0.20-0.23	6.6-8.4	Low	0.37		
Cm	0-4	27-39	1.45-1.70	0.2-0.6	0.20-0.22	5.6-7.8	Moderate	0.37	5	.5-2
Commerce	4-33	14-39	1.35-1.70	0.2-0.6	0.20-0.22	6.1-8.4	Moderate	0.32		
	33-60	14-60	1.35-1.75	0.2-2.0	0.20-0.23	6.6-8.4	Low	0.37		

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	G/cc	In/hr	In/in	pH				Pct
Co--------------- Commerce	0-8	27-39	1.45-1.70	0.2-0.6	0.20-0.22	5.6-7.8	Moderate-----	0.37	5	.5-2
	8-42	14-39	1.35-1.70	0.2-0.6	0.20-0.22	6.1-8.4	Moderate-----	0.32		
	42-60	14-60	1.35-1.75	0.2-2.0	0.20-0.23	6.6-8.4	Low-----------	0.37		
CR:										
Commerce---------	0-6	27-39	1.45-1.70	0.2-0.6	0.20-0.22	5.6-7.8	Moderate-----	0.37	5	.5-2
	6-28	14-39	1.35-1.70	0.2-0.6	0.20-0.22	6.1-8.4	Moderate-----	0.32		
	28-60	14-60	1.35-1.75	0.2-2.0	0.20-0.23	6.6-8.4	Low-----------	0.37		
Bruin------------	0-8	10-18	1.30-1.65	0.6-2.0	0.21-0.23	5.6-7.8	Low-----------	0.43	5	.5-4
	8-32	10-18	1.30-1.70	0.6-2.0	0.18-0.23	6.1-8.4	Low-----------	0.37		
	32-60	---	---	---	---	---	-------------	----		
Cv--------------- Crevasse	0-5	2-8	1.40-1.50	6.0-20	0.02-0.06	5.6-8.4	Low-----------	0.15	5	.5-2
	5-65	2-8	1.40-1.50	6.0-20	0.02-0.06	5.6-8.4	Low-----------	0.15		
Dd--------------- Dundee	0-7	5-18	1.30-1.70	0.6-2.0	0.15-0.20	4.5-6.0	Low-----------	0.37	5	.5-2
	7-27	18-34	1.30-1.80	0.2-0.6	0.15-0.20	4.5-6.0	Moderate-----	0.32		
	27-65	18-25	1.30-1.80	0.6-2.0	0.15-0.20	4.5-7.3	Low-----------	0.32		
De--------------- Dundee	0-8	10-30	1.30-1.80	0.6-2.0	0.15-0.20	4.5-6.0	Low-----------	0.37	5	.5-2
	8-36	18-34	1.30-1.80	0.2-0.6	0.15-0.20	4.5-6.0	Moderate-----	0.32		
	36-60	18-25	1.30-1.80	0.6-2.0	0.15-0.20	4.5-7.3	Low-----------	0.32		
Dh:										
Dundee-----------	0-5	5-18	1.30-1.70	0.6-2.0	0.15-0.20	4.5-6.0	Low-----------	0.37	5	.5-2
	5-24	18-34	1.30-1.80	0.2-0.6	0.15-0.20	4.5-6.0	Moderate-----	0.32		
	24-60	18-25	1.30-1.80	0.6-2.0	0.15-0.20	4.5-7.3	Low-----------	0.32		
Alligator--------	0-6	27-40	1.40-1.50	0.6-2.0	0.18-0.22	4.5-5.5	Moderate-----	0.37	5	1-3
	6-41	60-85	1.45-1.55	<0.06	0.14-0.18	4.5-5.5	Very high----	0.24		
	41-60	35-85	1.45-1.55	<0.06	0.14-0.18	6.1-7.3	Very high----	0.24		
Tensas-----------	0-5	40-60	1.20-1.50	<0.06	0.18-0.20	4.5-6.0	High----------	0.32	5	.5-2
	5-33	40-60	1.20-1.50	<0.06	0.18-0.20	4.5-6.0	Very high----	0.32		
	33-60	10-39	1.30-1.80	0.2-2.0	0.20-0.23	5.1-6.5	Low-----------	0.37		
Ds:										
Dundee-----------	0-7	5-18	1.30-1.70	0.6-2.0	0.15-0.20	4.5-6.0	Low-----------	0.37	5	.5-2
	7-22	18-34	1.30-1.80	0.2-0.6	0.15-0.20	4.5-6.0	Moderate-----	0.32		
	22-60	18-25	1.30-1.80	0.6-2.0	0.15-0.20	4.5-7.3	Low-----------	0.32		
Alligator--------	0-4	40-60	1.40-1.50	<0.06	0.18-0.20	4.5-5.5	High----------	0.32	5	1-3
	4-42	60-85	1.45-1.55	<0.06	0.14-0.18	4.5-5.5	Very high----	0.24		
	42-60	35-85	1.45-1.55	<0.06	0.14-0.18	6.1-7.3	Very high----	0.24		
Tensas-----------	0-4	40-60	1.20-1.50	<0.06	0.18-0.20	4.5-6.0	High----------	0.32	5	.5-2
	4-26	40-60	1.20-1.50	<0.06	0.18-0.20	4.5-6.0	Very high----	0.32		
	26-60	10-39	1.30-1.80	0.2-2.0	0.20-0.23	5.1-6.5	Low-----------	0.37		
Fa--------------- Fausse	0-12	40-95	0.80-1.45	<0.06	0.18-0.20	5.6-7.3	Very high----	0.20	5	2-15
	12-62	35-95	1.10-1.45	<0.2	0.18-0.22	6.1-8.4	Very high----	0.24		
La--------------- Latanier	0-5	40-55	1.20-1.70	<0.06	0.18-0.20	6.6-8.4	Very high----	0.32	5	.5-4
	5-24	40-55	1.20-1.70	<0.06	0.18-0.20	6.6-8.4	Very high----	0.32		
	24-72	10-27	1.30-1.65	0.06-2.0	0.18-0.22	6.6-8.4	Low-----------	0.37		

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cc	In/hr	In/in	pH				Pct
Ne---------------- Newellton	0-5	40-55	1.20-1.50	0.06-0.2	0.18-0.20	5.6-7.3	High---------	0.32	5	.5-2
	5-16	40-55	1.20-1.60	0.06-0.2	0.18-0.20	5.6-7.8	High---------	0.32		
	16-60	10-28	1.30-1.65	0.2-2.0	0.20-0.22	6.1-8.4	Low----------	0.37		
NS:										
Newellton--------	0-4	40-55	1.20-1.50	0.06-0.2	0.18-0.20	5.6-7.3	High---------	0.32	5	.5-2
	4-18	40-55	1.20-1.60	0.06-0.2	0.18-0.20	5.6-7.8	High---------	0.32		
	18-60	10-28	1.30-1.65	0.2-2.0	0.20-0.22	6.1-8.4	Low----------	0.37		
Sharkey----------	0-9	40-60	1.20-1.50	<0.06	0.12-0.18	5.1-8.4	Very high----	0.32	5	.5-4
	9-54	60-90	1.20-1.50	<0.06	0.12-0.18	5.6-8.4	Very high----	0.28		
	54-60	25-90	1.20-1.65	0.06-0.2	0.12-0.18	6.6-8.4	High---------	0.28		
Nw---------------- Norwood	0-5	10-27	1.35-1.65	0.6-2.0	0.17-0.21	7.4-8.4	Low----------	0.43	5	.5-3
	5-16	18-35	1.35-1.65	0.6-2.0	0.15-0.22	7.4-8.4	Low----------	0.43		
	16-86	10-35	1.35-1.65	0.6-2.0	0.15-0.22	7.4-8.4	Low----------	0.43		
Sa---------------- Sharkey	0-8	10-27	1.30-1.65	0.6-2.0	0.21-0.23	5.1-8.4	Low----------	0.43	5	.5-4
	8-34	60-90	1.20-1.50	<0.06	0.18-0.20	5.6-8.4	Very high----	0.28		
	34-60	25-90	1.20-1.75	0.06-0.2	0.18-0.22	6.6-8.4	High---------	0.28		
Sh---------------- Sharkey	0-11	40-60	1.20-1.50	<0.06	0.18-0.20	5.1-8.4	Very high----	0.32	5	.5-4
	11-47	60-90	1.20-1.50	<0.06	0.18-0.20	5.6-8.4	Very high----	0.28		
	47-75	25-90	1.20-1.75	0.06-0.2	0.18-0.22	6.6-8.4	High---------	0.28		
Sk---------------- Sharkey	0-9	40-60	1.20-1.50	<0.06	0.12-0.18	5.1-8.4	Very high----	0.32	5	.5-4
	9-38	60-90	1.20-1.50	<0.06	0.12-0.18	5.6-8.4	Very high----	0.28		
	38-60	25-90	1.20-1.65	0.06-0.2	0.12-0.18	6.6-8.4	High---------	0.28		
Sm---------------- Sharkey	0-5	40-60	1.20-1.50	<0.06	0.12-0.18	5.1-8.4	Very high----	0.32	5	.5-4
	5-48	60-90	1.20-1.50	<0.06	0.12-0.18	5.6-8.4	Very high----	0.28		
	48-60	25-90	1.20-1.65	0.06-0.2	0.12-0.18	6.6-8.4	High---------	0.28		
So---------------- Sharkey	0-11	40-60	1.20-1.50	<0.06	0.12-0.18	5.1-8.4	Very high----	0.32	5	.5-4
	11-41	60-90	1.20-1.50	<0.06	0.12-0.18	5.6-8.4	Very high----	0.28		
	41-96	25-90	1.20-1.65	0.06-0.2	0.12-0.18	6.6-8.4	High---------	0.28		
Sr---------------- Sharkey	0-10	40-60	1.20-1.50	<0.06	0.12-0.18	5.1-8.4	Very high----	0.32	5	.5-4
	10-48	60-90	1.20-1.50	<0.06	0.12-0.18	5.6-8.4	Very high----	0.28		
	48-65	25-90	1.20-1.65	0.06-0.2	0.12-0.18	6.6-8.4	High---------	0.28		
SS:										
Sostien----------	0-6	35-60	1.20-1.35	<0.06	0.18-0.20	6.1-8.4	Very high----	0.24	5	1-3
	6-60	35-60	1.20-1.65	<0.06	0.18-0.20	6.1-8.4	Very high----	0.24		
Cocodrie---------	0-65	10-18	1.35-1.65	0.6-2.0	0.21-0.23	6.1-8.4	Low----------	0.43	5	.5-4
ST:										
Sostien----------	0-4	35-60	1.20-1.35	<0.06	0.18-0.20	6.1-8.4	Very high----	0.24	5	1-3
	4-65	35-60	1.20-1.65	<0.06	0.18-0.20	6.1-8.4	Very high----	0.24		
Crevasse---------	0-4	2-8	1.40-1.50	6.0-20	0.02-0.06	5.6-8.4	Low----------	0.15	5	.5-2
	4-65	2-8	1.40-1.50	6.0-20	0.02-0.06	5.6-8.4	Low----------	0.15		
Tc---------------- Tensas	0-5	40-60	1.20-1.50	<0.06	0.18-0.20	4.5-6.0	High---------	0.32	5	.5-4
	5-29	40-60	1.20-1.50	<0.06	0.18-0.20	4.5-6.0	Very high----	0.32		
	29-65	10-39	1.30-1.80	0.2-2.0	0.20-0.23	5.1-6.5	Low----------	0.37		
Te---------------- Tensas	0-4	40-60	1.20-1.50	<0.06	0.18-0.20	4.5-6.0	High---------	0.32	5	.5-4
	4-26	40-60	1.20-1.50	<0.06	0.18-0.20	4.5-6.0	Very high----	0.32		
	26-64	10-39	1.30-1.80	0.2-2.0	0.20-0.23	5.1-6.5	Low----------	0.37		

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	G/cc	In/hr	In/in	pH				Pct
To:										
Tensas	0-5	40-60	1.20-1.50	<0.06	0.18-0.20	4.5-6.0	High	0.32	5	.5-4
	5-25	40-60	1.20-1.50	<0.06	0.18-0.20	4.5-6.0	Very high	0.32		
	25-60	10-39	1.30-1.80	0.2-2.0	0.20-0.23	5.1-6.5	Low	0.37		
Alligator	0-7	40-60	1.20-1.50	<0.06	0.18-0.20	4.5-5.5	High	0.32	5	1-3
	7-43	60-85	1.20-1.55	<0.06	0.14-0.18	4.5-5.5	Very high	0.24		
	43-60	35-85	1.20-1.55	<0.06	0.14-0.18	6.1-7.3	Very high	0.24		
Tr:										
Tensas	0-4	40-60	1.20-1.50	<0.06	0.18-0.20	4.5-6.0	High	0.32	5	.5-4
	4-24	40-60	1.20-1.50	<0.06	0.18-0.20	4.5-6.0	Very high	0.32		
	24-60	10-39	1.30-1.80	0.2-2.0	0.20-0.23	5.1-6.5	Low	0.37		
Alligator	0-7	40-60	1.20-1.50	<0.06	0.18-0.20	4.5-5.5	High	0.32	5	1-3
	7-42	60-85	1.20-1.55	<0.06	0.14-0.18	4.5-5.5	Very high	0.24		
	42-60	35-85	1.20-1.55	<0.06	0.14-0.18	6.1-7.3	Very high	0.24		
Ts Tunica	0-6	35-75	1.20-1.55	<0.06	0.15-0.20	5.6-7.8	High	0.32	5	1-3
	6-26	35-75	1.20-1.55	<0.06	0.15-0.20	5.6-7.8	High	0.32		
	26-80	10-32	1.40-1.50	0.06-2.0	0.10-0.22	5.6-8.4	Low	0.32		
Tt Tunica	0-4	35-75	1.20-1.55	<0.06	0.15-0.20	5.6-7.8	High	0.32	5	1-3
	4-27	35-75	1.20-1.55	<0.06	0.15-0.20	5.6-7.8	High	0.32		
	27-65	10-32	1.40-1.50	0.06-2.0	0.10-0.22	5.6-8.4	Low	0.32		
Tu:										
Tunica	0-5	35-75	1.20-1.55	<0.06	0.15-0.20	5.6-7.8	High	0.32	5	1-3
	5-26	35-75	1.20-1.55	<0.06	0.15-0.20	5.6-7.8	High	0.32		
	26-65	10-32	1.40-1.50	0.06-2.0	0.10-0.22	5.6-8.4	Low	0.32		
Sharkey	0-4	40-60	1.20-1.50	<0.06	0.18-0.20	5.1-8.4	Very high	0.32	5	.5-2
	4-41	60-90	1.20-1.50	<0.06	0.18-0.20	5.6-8.4	Very high	0.28		
	41-60	25-90	1.20-1.75	0.06-0.2	0.18-0.22	6.6-8.4	High	0.28		
Ty:										
Tunica	0-6	35-75	1.20-1.55	<0.06	0.15-0.20	5.6-7.8	High	0.32	5	1-3
	6-31	35-75	1.20-1.55	<0.06	0.15-0.20	5.6-7.8	High	0.32		
	31-60	10-32	1.40-1.50	0.06-2.0	0.10-0.22	5.6-8.4	Low	0.32		
Sharkey	0-9	40-60	1.20-1.50	<0.06	0.18-0.20	5.1-8.4	Very high	0.32	5	.5-2
	9-52	60-90	1.20-1.50	<0.06	0.18-0.20	5.6-8.4	Very high	0.28		
	52-65	25-90	1.20-1.75	0.06-0.2	0.18-0.22	6.6-8.4	High	0.28		

TABLE 17.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated. The flooding frequency for the cropping period, June through November, may be less often than the frequency shown in this table. For additional information on flooding see the map unit description]

Map symbol and soil name	Hydrologic group	Flooding			High water table			Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Uncoated steel	Concrete
					Ft				
Aa Alligator	D	Rare	---	---	0.5-2.0	Apparent	Jan-Apr	High	Moderate.
Ab, Ac Alligator	D	Occasional	Brief to long.	Jan-Jun	0.5-2.0	Apparent	Jan-Apr	High	Moderate.
Ba Baldwin	D	Rare	---	---	0-2.0	Apparent	Dec-Apr	High	Moderate.
Bn, Br Bruin	B	None	---	---	>6.0	---	---	High	Low.
Bu Bruin	B	Occasional	Brief to long.	Dec-Jul	>6.0	---	---	High	Low.
Bw:									
Bruin	B	None	---	---	>6.0	---	---	High	Low.
Tunica	D	Rare	---	---	1.5-3.0	Apparent	Jan-Apr	High	Low.
Ca, Cb Commerce	C	None	---	---	1.5-4.0	Apparent	Dec-Apr	High	Low.
Cc Commerce	C	Occasional	Brief to long.	Dec-Jun	1.5-4.0	Apparent	Dec-Apr	High	Low.
Cm Commerce	C	None	---	---	1.5-4.0	Apparent	Dec-Apr	High	Low.
Co Commerce	C	Occasional	Brief to long.	Dec-Jun	1.5-4.0	Apparent	Dec-Apr	High	Low.
CR:									
Commerce	C	Frequent	Brief to long.	Dec-Jun	1.5-4.0	Apparent	Dec-Apr	High	Low.
Bruin	B	Frequent	Brief to long.	Dec-Jun	>6.0	---	---	High	Low.
Cv Crevasse	A	Frequent	Brief	Jan-Dec	3.5-6.0	Apparent	Nov-Mar	Low	Moderate.
Dd, De Dundee	C	None	---	---	1.5-3.5	Apparent	Jan-Apr	High	Moderate.
Dh, Ds:									
Dundee	C	None	---	---	1.5-3.5	Apparent	Jan-Apr	High	Moderate.
Alligator	D	Rare	---	---	0.5-2.0	Apparent	Jan-Apr	High	Moderate.
Tensas	D	Rare	---	---	1.0-3.0	Apparent	Dec-Apr	High	Moderate.
Fa Fausse	D	Frequent	Brief to very long.	Jan-Dec	+1.-1.5	Apparent	Jan-Dec	High	Low.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table			Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Uncoated steel	Concrete
					Ft				
La Latanier	D	Occasional	Brief	Nov-Jul	1.0-3.0	Apparent	Dec-Apr	High	Low.
Ne Newellton	D	Rare	---	---	1.0-3.0	Apparent	Dec-Apr	High	Low.
NS:									
Newellton	D	Frequent	Brief to long.	Jan-Dec	1.0-3.0	Apparent	Dec-Apr	High	Low.
Sharkey	D	Frequent	Brief to very long.	Jan-Dec	0-2.0	Apparent	Dec-Apr	High	Low.
Nw Norwood	B	Occasional	Very brief	Oct-Mar	>6.0	---	---	High	Low.
Sa, Sh Sharkey	D	Rare	---	---	0-2.0	Apparent	Dec-Apr	High	Low.
Sk, Sm Sharkey	D	Occasional	Brief to very long.	Dec-Jul	0-2.0	Apparent	Dec-Apr	High	Low.
So Sharkey	D	Frequent	Brief to very long.	Dec-Jul	0-2.0	Apparent	Dec-Apr	High	Low.
Sr Sharkey	D	Occasional	Brief to very long.	Dec-Jul	0-2.0	Apparent	Dec-Apr	High	Low.
SS:									
Sostien	D	Occasional	Brief to long.	Dec-Jun	0-2.0	Apparent	Dec-Apr	High	Low.
Cocodrie	C	Occasional	Brief to long.	Dec-Jun	2.0-3.0	Apparent	Dec-Apr	High	Low.
ST:									
Sostien	D	Rare	---	---	0-2.0	Apparent	Dec-Apr	High	Low.
Crevasse	A	Rare	---	---	3.5-6.0	Apparent	Dec-Apr	Low	Moderate.
Tc Tensas	D	Rare	---	---	1.0-3.0	Apparent	Dec-Apr	High	Moderate.
Te Tensas	D	Occasional	Brief to long.	Dec-Jun	1.0-3.0	Apparent	Dec-Apr	High	Moderate.
To:									
Tensas	D	None	---	---	1.0-3.0	Apparent	Dec-Apr	High	Moderate.
Alligator	D	Rare	---	---	0.5-2.0	Apparent	Jan-Apr	High	Moderate.
Tr:									
Tensas	D	Occasional	Brief to long.	Dec-Jun	1.0-3.0	Apparent	Dec-Apr	High	Moderate.
Alligator	D	Occasional	Brief to long.	Jan-Apr	0.5-2.0	Apparent	Jan-Apr	High	Moderate.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table			Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Uncoated steel	Concrete
					Ft				
Ts----------------- Tunica	D	Rare---------	---	---	1.5-3.0	Apparent	Jan-Apr	High-----	Low.
Tt----------------- Tunica	D	Occasional	Brief to long.	Jan-Apr	1.5-3.0	Apparent	Jan-Apr	High-----	Low.
Tu:									
Tunica-----------	D	None---------	---	---	1.5-3.0	Apparent	Jan-Apr	High-----	Low.
Sharkey----------	D	Rare---------	---	---	0-2.0	Apparent	Dec-Apr	High-----	Low.
Ty:									
Tunica-----------	D	Occasional	Brief to long.	Jan-Apr	1.5-3.0	Apparent	Jan-Apr	High-----	Low.
Sharkey----------	D	Occasional	Brief to very long.	Dec-Jun	0-2.0	Apparent	Dec-Apr	High-----	Low.

TABLE 18.--FERTILITY TEST DATA ON SELECTED SOILS

[Analysis by the Soil Fertility Laboratory of the Louisiana Agricultural Experiment Station. The symbol < means less than]

Soil name and sample number	Depth from surface	Horizon	pH 1:1 H_2O	Organic matter content	Extractable P	Exchangeable cations						Extractable acidity	Cation exchange capacity (sum)	Base saturation (sum)	Saturation	
						Ca	Mg	K	Na	Al	H				Percent of sum of CEC	Percent of effective CEC
	In			Pct	ppm	Meg/100g								Pct		
Alligator clay: *	0-5	Ap	6.0	2.31	55	26.0	9.2	1.0	0.1	0.0	0.2	12.2	48.5	74.8	0.0	<1.0
(S82LA-29-5)	5-11	Bg1	4.9	0.52	55	23.0	10.6	0.8	0.3	1.6	0.4	15.0	49.7	69.8	4.4	<1.0
	11-23	Bg2	5.3	0.44	41	23.1	11.8	0.9	0.4	1.1	0.2	13.2	49.4	73.3	2.9	<1.0
	23-40	Bg3	5.3	0.38	81	24.8	12.7	0.8	0.6	0.2	0.3	13.2	52.1	74.7	1.0	1.2
	40-65	Cg	6.1	0.28	73	23.6	12.0	0.7	0.7	0.0	0.2	8.0	45.0	82.2	0.0	1.6
Baldwin silty clay loam: *	0-7	Ap	5.7	1.69	84	10.8	4.5	0.2	0.1	0.0	0.3	11.1	26.7	58.4	0.0	0.3
(S82LA-29-9)	7-17	Btg1	6.0	0.99	19	14.8	6.4	0.2	0.3	0.0	0.1	8.7	30.4	71.3	0.0	0.9
	17-28	Btg2	6.5	0.54	40	13.6	6.4	0.2	0.6	0.0	0.1	7.3	28.1	74.0	0.0	2.1
	28-34	BCg1	6.8	0.41	44	13.4	6.5	0.2	0.8	0.0	0.1	7.3	28.2	74.1	0.0	2.8
	34-44	BCg2	7.0	0.54	55	12.4	9.8	0.2	1.4	0.0	0.0	8.7	32.5	73.2	0.0	4.3
	44-60	Cg1	7.5	0.01	51	19.6	10.2	0.3	1.3	0.0	0.0	1.0	32.4	96.9	0.0	4.0
	60-71	Cg2	7.4	0.01	35	19.2	8.2	0.2	0.6	0.0	0.0	2.0	30.2	93.3	0.0	1.9
Bruin silt loam: *	0-7	Ap	6.4	2.22	84	12.6	1.5	0.4	<0.1	0.0	0.1	7.2	21.7	66.8	0.0	<0.1
(S82LA-29-10)	7-15	Bw1	7.5	0.94	213	3.0	2.5	0.1	<0.1	0.0	0.0	5.6	11.2	50.0	0.0	<0.1
	15-22	Bw2	7.6	0.81	235	8.0	2.2	0.1	<0.1	0.0	0.0	2.1	12.4	83.0	0.0	<0.1
	22-31	BC	6.8	0.14	165	6.0	3.3	0.1	<0.1	0.0	0.1	2.4	11.8	79.6	0.0	<0.1
	31-42	C1	6.8	0.81	85	5.6	3.1	<0.1	0.1	0.0	0.1	2.2	11.0	80.0	0.0	0.9
	42-51	C2	6.7	0.50	120	8.8	3.3	0.1	0.1	0.0	0.1	2.3	14.6	84.2	0.0	0.6
	51-65	C3	6.5	0.32	97	14.2	2.7	0.1	0.1	0.0	0.1	1.8	18.9	90.4	0.0	0.5
Crevasse fine sand: *	0-5	A	6.7	0.50	181	6.8	0.5	0.1	0.1	0.0	0.1	0.3	7.6	96.0	0.0	<0.1
(S82LA-29-11)	5-37	C1	6.8	0.24	155	1.6	0.6	0.1	0.1	0.0	0.1	0.3	2.5	88.0	0.0	<0.1
	37-65	C2	7.0	0.37	53	0.6	0.4	0.1	0.1	0.0	0.0	0.3	1.3	76.9	0.0	<0.1
Fausse clay: *	2-12	Ag	7.1	2.00	93	34.8	7.4	0.6	0.6	0.0	0.0	11.7	55.1	78.7	0.0	1.0
(S82LA-29-12)	12-38	Bg	6.4	0.45	122	40.0	7.5	0.6	0.8	0.0	0.1	8.1	57.0	85.7	0.0	1.4
	38-62	Cg	6.6	0.63	134	35.2	7.1	0.6	0.7	0.0	0.1	5.6	49.2	88.6	0.0	1.4
Latanier clay: *	0-5	Ap	7.6	2.38	206	28.0	6.9	1.0	0.1	0.0	0.2	3.8	39.8	90.5	0.0	<1.0
(S82LA-29-7)	5-14	Bw1	7.7	0.81	142	29.8	6.6	0.6	0.2	0.0	0.2	2.4	39.6	93.9	0.0	<1.0
	14-24	Bw2	7.6	0.70	135	25.7	6.7	0.6	0.2	0.0	0.2	3.3	36.5	91.0	0.0	<1.0
	24-32	2C1	7.4	0.25	80	15.4	4.4	0.4	0.2	0.0	0.2	1.9	22.3	91.5	0.0	<1.0
	32-39	2C2	7.7	0.02	76	4.8	1.3	0.1	0.1	0.0	0.0	0.0	6.3	100.0	0.0	1.6
	39-72	2C3	7.6	0.15	106	10.1	3.3	0.2	0.2	0.0	0.2	2.8	16.6	83.1	0.0	1.2
Newellton clay: *	0-5	Ap	6.5	0.82	124	16.4	6.9	0.4	0.1	0.0	0.0	7.1	30.9	77.0	0.0	0.3
(S82LA-29-13)	5-16	B	7.3	0.15	207	17.0	8.8	0.4	0.1	0.0	0.0	7.6	33.9	77.5	0.0	0.2
	16-20	2C1	8.0	0.10	119	21.2	6.9	0.2	0.1	0.0	0.0	5.6	34.0	83.5	0.0	0.2
	20-30	2C2	8.0	0.19	165	14.8	4.6	0.2	0.4	0.0	0.0	2.5	22.5	88.8	0.0	1.7
	30-46	2C3	7.9	0.10	146	12.0	4.0	0.2	0.3	0.0	0.0	1.0	17.5	94.2	0.0	1.7
	46-60	2C4	7.1	0.10	64	10.1	3.5	0.1	0.3	0.0	0.0	0.5	14.5	96.5	0.0	2.0

See footnotes at end of table.

TABLE 18.--FERTILITY TEST DATA ON SELECTED SOILS--Continued

Soil name and sample number	Depth from surface	Horizon	pH 1:1 H_2O	Organic matter content	Extractable P	Exchangeable cations						Extractable acidity	Cation exchange capacity (sum)	Base saturation (sum)	Saturation	
						Ca	Mg	K	Na	Al	H				Percent of sum of CEC	Percent of effective CEC
	In			Pct	ppm	Meg/100g								Pct		
Norwood silt loam: *	0-5	A	7.4	1.88	129	18.0	3.6	0.4	0.1	0.0	0.2	0.9	23.0	96.1	0.0	<1.0
(S82LA-29-6)	5-16	B	7.8	0.46	87	15.4	4.0	0.4	0.1	0.0	0.2	0.4	20.3	98.0	0.0	<1.0
	16-23	C1	7.9	0.38	117	16.7	3.0	0.3	0.1	0.0	0.2	1.4	21.5	93.5	0.0	<1.0
	23-57	C2	8.0	0.25	102	16.8	2.3	0.3	0.1	0.0	0.2	0.4	19.9	98.0	0.0	<1.0
	57-86	C3	7.8	0.49	109	16.1	2.8	0.3	0.2	0.0	0.0	0.0	19.4	100.0	0.0	1.0
Sharkey clay, overwash: **	0-10	A	6.0	0.86	67	19.6	12.8	1.0	0.2	0.0	0.2	9.0	42.6	78.9	0.0	1.0
(S82LA-29-8)	10-16	2Ag	6.5	0.57	47	23.8	14.4	0.7	0.3	0.0	0.2	7.0	46.2	84.8	0.0	1.0
	16-27	2Bg1	6.8	0.54	27	25.9	14.8	0.7	0.4	0.0	0.2	7.6	49.4	84.6	0.0	1.0
	27-48	2Bg2	7.4	0.28	72	26.8	15.3	0.8	1.4	0.0	0.2	6.1	50.4	87.9	0.0	2.8
	48-65	2Cg	7.5	0.31	62	38.6	16.5	0.8	2.4	0.0	0.2	6.6	64.9	89.8	0.0	3.7
Tunica clay: *	0-6	Ap	6.2	3.00	82	17.6	6.8	0.6	0.1	0.0	0.1	6.6	31.7	79.1	0.0	0.3
(S82LA-29-14)	6-16	Bg1	6.2	0.90	44	19.0	8.5	0.4	0.2	0.0	0.1	9.6	33.7	71.5	0.0	0.5
	16-26	Bg2	6.2	0.72	54	20.4	10.2	0.4	0.2	0.0	0.1	9.6	40.8	76.4	0.0	0.4
	26-32	2Cg1	6.7	0.46	110	14.4	7.4	0.2	0.4	0.0	0.1	6.1	28.5	78.5	0.0	1.4
	32-44	2Cg2	7.5	0.19	186	8.4	3.4	0.1	0.1	0.0	0.0	1.5	13.5	88.8	0.0	0.7
	44-80	2Cg3	8.0	0.24	167	29.6	4.5	0.2	0.1	0.0	0.0	0.5	34.9	98.5	0.0	0.2

* Typical pedon for the series. For the description and location see the section "Soil Series and Their Morphology."

** Pedon located 3 miles southeast of Delhaste on levee road, 0.4 mile north on Red River wildlife management area road to first parking area, 100 feet east of road, NW1/4 sec. 2, T. 3 N., R. 7 E.

TABLE 19.--PHYSICAL TEST DATA FOR SELECTED SOILS

[Analysis by Soil Characterization Laboratory of the Louisiana Agricultural Experiment Station. The symbol < means less than. All of the soils in this table are the same as the typical pedon for the series. For the description and location of each of the soils, see the section "Soil Series and Their Morphology"]

Soil name and sample number	Horizon	Depth from surface	Particle-size distribution			Water content at tension		Water retention difference	Bulk density		Extensibility COLE*
			Sand 2.0-0.05mm	Silt 0.05-0.002mm	Clay <0.002mm	1/3 Bar	15 Bar		Oven-dry	Field-moisture	
		In	Pct	Pct	Pct	Pct	Pct	Pct	G/cc	G/cc	
Commerce silt loam: (S82LA-29-2)	Ap	0-5	7.1	66.2	26.7	38.8	12.7	26.1	1.39	1.20	0.05
	B	5-12	21.8	57.6	20.6	31.6	9.0	22.6	1.61	1.51	0.02
	BC	12-20	25.4	55.3	19.3	30.7	8.3	22.4	1.52	1.45	0.02
	C1	20-28	29.2	55.8	15.0	28.6	7.1	21.5	1.51	1.44	0.02
	C2	28-38	13.1	54.1	32.8	36.6	14.1	22.5	1.60	1.34	0.06
	C3	38-60	3.2	72.9	23.9	36.3	10.8	25.5	1.48	1.35	0.03
Dundee loam: (S82LA-29-4)	Ap	0-7	46.9	36.4	16.7	16.4	6.6	9.8	1.61	1.57	0.01
	Bt1	7-15	41.7	29.4	28.9	25.3	11.1	14.2	1.82	1.65	0.03
	Bt2	15-27	50.0	25.6	24.4	22.5	10.1	12.4	1.59	1.49	0.02
	BC	27-37	43.5	32.4	24.1	22.0	9.2	12.8	1.57	1.47	0.02
	C1	37-48	45.5	30.2	24.3	20.7	7.5	13.2	1.50	1.48	0.00
	2C2	48-65	32.8	45.0	22.2	21.0	8.7	12.3	1.51	1.50	0.00
Sharkey clay: (S82LA-29-1)	Ap	0-11	0.4	37.0	62.6	54.0	24.1	29.9	1.84	1.18	0.16
	Bg1	11-22	0.8	26.4	72.8	60.3	27.3	33.0	1.80	1.12	0.17
	Bg2	22-32	1.0	26.2	72.8	51.9	26.9	25.0	1.76	1.15	0.15
	BCg	32-47	1.0	24.3	74.7	61.4	28.0	33.4	1.80	1.24	0.13
	Cg1	47-59	1.0	25.6	73.4	59.9	27.3	32.6	1.84	1.22	0.15
	Cg2	59-75	1.2	25.3	73.5	58.7	27.6	31.1	1.93	1.24	0.16
Tensas silty clay: (S82LA-29-3)	Ap	0-5	13.3	42.9	43.8	34.5	15.6	18.9	1.65	1.27	0.09
	Bt1	5-10	12.1	40.0	47.9	36.6	17.7	18.9	1.84	1.40	0.10
	Bt2	10-21	18.6	36.7	44.7	35.0	16.9	18.1	1.76	1.43	0.07
	Bt3	21-29	14.7	46.0	39.3	36.2	15.0	21.2	1.78	1.47	0.07
	2BC1	29-34	22.1	44.2	33.7	34.5	13.2	21.3	1.72	1.49	0.05
	2BC2	34-43	25.9	43.6	30.5	32.9	14.6	18.3	1.64	1.50	0.03
	2C	43-65	23.5	45.4	30.7	31.3	14.0	17.3	1.66	1.49	0.04

* COLE (Coefficient of Linear Extensibility): A quantitative method of determining shrink-swell behavior of soil. It is an estimate of the vertical component of swelling of natural soil clod. COLE is expressed as: low (0.03); moderate (0.03-0.06); and high (0.06).

TABLE 20.--CHEMICAL TEST DATA FOR SELECTED SOILS

[Analysis by soil Characterization Laboratory of the Louisiana Agricultural Experiment Station. All of the soils in this table are the same as the typical pedon for the series. For the description and location of each of the soils, see the section "Soil Series and Their Morphology"]

Soil name and sample number	Horizon	Depth from surface	Exchangeable cations				Extractable acidity	Cation exchange capacity	Base saturation	Organic matter content	Nitrogen	pH		Extractable iron	Extractable aluminum	Extractable phosphorus
			Ca	Mg	K	Na		(NH$_4$OAc)	(NH$_4$OAc)			(1:1) H$_2$O	(1:2) CaCl$_2$			
		In	Meg/100g						Pct	Pct	Pct			Pct	Meg/100g	ppm
Commerce silt loam: (S82LA-29-2)	Ap	0-5	20.7	4.9	0.8	0.3	2.7	18.2	147.0	1.9	0.19	7.3	6.9	0.4	0.0	53
	B	5-12	12.8	4.6	0.2	0.3	1.6	16.2	110.0	0.4	0.06	7.5	7.3	0.2	0.0	14
	BC	12-20	12.2	5.3	0.2	0.4	1.6	15.8	115.0	0.3	0.05	7.9	7.3	0.4	0.0	11
	C1	20-28	13.0	4.2	0.2	0.6	0.8	13.7	131.0	0.3	0.05	8.1	7.5	0.2	0.0	10
	C2	28-38	14.0	6.1	0.3	0.7	2.7	23.2	909.0	0.5	0.06	7.8	7.4	0.4	0.0	14
	C3	38-60	20.0	4.6	0.3	0.7	1.2	18.3	140.0	0.4	0.05	7.7	7.5	0.4	0.0	16
Dundee loam: (S82LA-29-4)	Ap	0-7	8.5	1.7	0.2	0.2	3.9	10.8	98.1	0.7	0.06	6.3	5.5	0.3	0.0	28
	Bt1	7-15	9.5	2.3	0.2	0.4	8.9	15.6	79.5	0.4	0.05	4.9	4.3	0.4	1.6	18
	Bt2	15-27	7.6	2.3	0.2	0.3	10.1	15.0	69.3	0.2	0.05	4.7	4.1	0.4	2.4	35
	BC	27-37	7.6	2.2	0.2	0.4	8.9	14.4	72.2	0.2	0.05	4.7	4.1	0.4	2.0	38
	C1	37-48	7.0	1.9	0.1	0.4	6.7	12.4	75.8	0.2	0.04	5.0	4.2	0.3	1.5	45
	2C2	48-65	9.3	2.7	0.1	0.7	5.4	13.7	93.7	0.2	0.03	5.4	4.5	0.3	0.5	45
Sharkey clay: (S82LA-29-1)	Ap	0-11	24.5	10.0	0.7	0.5	11.2	42.4	84.2	1.8	0.20	5.8	5.3	0.5	0.0	34
	Bg1	11-22	28.0	12.3	0.6	0.1	8.9	40.8	100.0	0.6	0.09	6.2	5.9	0.5	0.0	14
	Bg2	22-32	29.5	12.8	0.4	0.3	6.6	41.1	105.0	0.5	0.07	6.8	6.6	0.5	0.0	18
	BCg	32-47	33.5	13.3	0.6	0.3	2.7	41.7	114.0	0.5	0.07	7.6	7.5	0.3	0.0	19
	Cg1	47-59	32.5	13.6	0.6	0.4	5.4	41.1	115.0	0.1	0.07	7.3	7.2	0.2	0.0	11
	Cg2	59-75	36.0	14.7	0.6	0.4	4.6	40.5	128.0	0.6	0.07	7.4	7.5	0.3	0.0	19
Tensas silty clay: (S82LA-29-3)	Ap	0-5	15.6	5.1	0.5	0.2	10.4	25.0	85.6	1.3	0.16	5.3	4.9	0.6	0.1	31
	Bt1	5-10	13.5	5.2	0.3	0.3	12.4	26.7	72.3	0.5	0.07	4.7	4.3	0.6	2.1	19
	Bt2	10-21	13.2	5.3	0.3	0.2	10.8	23.8	79.8	0.4	0.06	4.9	4.4	0.5	1.5	10
	Bt3	21-29	13.1	5.2	0.3	0.5	8.9	22.6	84.5	0.3	0.06	5.9	4.6	0.3	0.8	24
	2BC1	29-34	12.2	4.8	0.2	0.5	7.0	20.7	85.5	0.2	0.04	5.3	4.7	0.3	0.5	44
	2BC2	34-43	11.9	4.7	0.2	0.5	6.6	20.4	84.8	0.2	0.04	5.5	4.9	0.3	0.4	40
	2C	43-65	12.1	4.7	0.2	0.5	6.4	20.3	86.2	0.1	0.03	5.6	4.9	0.3	0.2	47

TABLE 21.--MINERALOGY DATA OF SILT AND CLAY FRACTIONS OF SELECTED SOILS

[Analysis by Soils Laboratory of the Louisiana Agricultural Experiment Station. Dash indicates analysis not made. The symbol < means less than. All of the soils in this table are the same as the typical pedon for the series. For the description and location of each of the soils, see the section "Soil Series and Their Morphology"]

Soil name and sample number	Depth from surface	Horizon	Silt and very * fine sand fractions 2-100	Clay fraction * <2.0
	In		Micron	
Commerce silt loam:	12-20	BC	M2, F2, Q2	---
(S82LA-29-2)	20-28	C1	M2, F2, Q2	---
	28-38	C2	M2, F2, Q2	---
Dundee loam:	7-15	Bt1	M2, F2, Q2	---
(S82LA-29-4)	15-27	Bt2	M2, F2, Q2	---
	27-37	BC	M2, F2, Q2	---
Sharkey clay:	11-22	Bg1	---	SM1, M2, K2, I3, Q3, F3
(S82LA-29-4)	22-32	Bg2	---	SM1, M2, K2, I3, Q3, F3
	32-47	BCg	---	SM1, M2, K2, I3, Q3, F3
Tensas silty clay:	5-10	Bt1	---	SM1, M2, K2, I3, Q3, F3
(S82LA-29-3)	10-21	Bt2	---	SM1, M2, K2, I3, Q3, F3
	21-29	Bt3	M2, F2, Q2	---
	29-34	2BC1	M2, F2, Q2	---
	34-43	2BC2	M2, F2, Q2	---

* Code for mineralogical data in Silt and very fine sand fractions and Clay fractions columns: The letter represents the kind of mineral (A); and the number represents the quantity of mineral (B). Minerals are listed in the table in order of abundance, decreasing from left to right.

A. Kind of mineral:

F--felspars
K--kaolinite
Q--quartz
M--mica
SM--smectite
I--interlayered and interstratified

B. Quantity of mineral:

1--Abundant--greater than 40 percent
2--Moderate--10 to 40 percent
3--Slight--Less than 10 percent

TABLE 22.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Alligator	Very-fine, montmorillonitic, acid, thermic Vertic Haplaquepts
Baldwin	Fine, montmorillonitic, thermic Vertic Ochraqualfs
Bruin	Coarse-silty, mixed, thermic Fluvaquentic Eutrochrepts
*Cocodrie	Coarse-silty, mixed, nonacid, thermic Aquic Udifluvents
Commerce	Fine-silty, mixed, nonacid, thermic Aeric Fluvaquents
Crevasse	Mixed, thermic Typic Udipsamments
Dundee	Fine-silty, mixed, thermic Aeric Ochraqualfs
Fausse	Very-fine, montmorillonitic, nonacid, thermic Typic Fluvaquents
Latanier	Clayey over loamy, mixed, thermic Vertic Hapludolls
Newellton	Clayey over loamy, montmorillonitic, nonacid, thermic Aeric Fluvaquents
Norwood	Fine-silty, mixed (calcareous), thermic Typic Udifluvents
**Sharkey	Very-fine, montmorillonitic, nonacid, thermic Vertic Haplaquepts
Sostien	Fine, montmorillonitic, nonacid, thermic Vertic Fluvaquents
Tensas	Fine, montmorillonitic, thermic Aeric Ochraqualfs
Tunica	Clayey over loamy, montmorillonitic, nonacid, thermic Vertic Haplaquepts

* The Crevasse soils in map unit ST are taxadjuncts to the Crevasse series, because they have thin strata and pockets of finer textured materials within 40 inches of the surface.

** The Sharkey soils in map unit Sr are taxadjuncts to the Sharkey series, because they have a dark reddish brown surface layer.

TABLE 23.--RELATIONSHIPS BETWEEN SOILS AND TOPOGRAPHY, RUNOFF, DRAINAGE, AND WATER TABLE

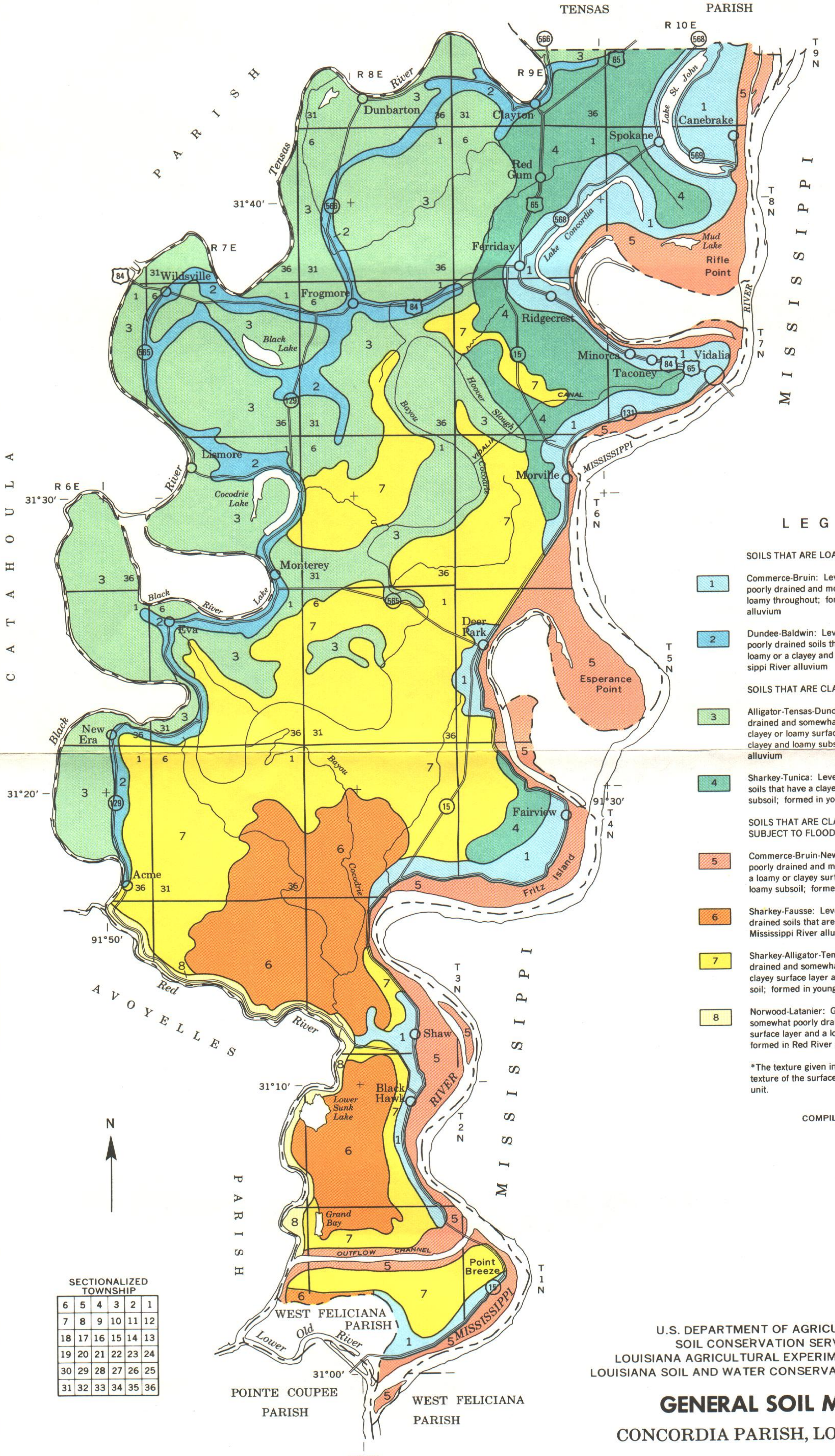
Parent material and soil series	Slope	Runoff	Natural drainage	Seasonal high water table	
				Depth	Duration
Mississippi River meander belt deposits					
Alligator	Level and gently undulating	Slow and very slow	Poorly drained	0.5-2.0	Jan.-April
Baldwin	Level	Slow	Poorly drained	0.0-2.0	Dec.-April
Bruin	Level and gently undulating	Medium	Moderately well drained	>0.6	None
Commerce	Level and gently undulating	Slow	Somewhat poorly drained	1.5-4.0	Dec.-April
Crevasse	Level to undulating	Slow	Excessively drained	3.5-6.0	Nov.-March
Dundee	Level to undulating	Slow and medium	Somewhat poorly drained	1.5-3.5	Jan.-April
Fausse	Level	Ponded	Very poorly drained	+1.0-1.5	Jan.-Dec.
Newellton	Level to undulating	Slow and medium	Somewhat poorly drained	1.0-3.0	Dec.-April
Sharkey	Level and gently undulating	Slow	Poorly drained	0.0-2.0	Dec.-April
Tensas	Level to undulating	Slow and medium	Somewhat poorly drained	1.0-3.0	Dec.-April
Tunica	Level and gently undulating	Slow and medium	Poorly drained	1.5-3.0	Jan.-April
Present Red River meander belt deposits					
Latanier	Gently undulating	Slow	Somewhat poorly drained	1.0-3.0	Dec.-April
Norwood	Gently undulating	Slow	Well drained	>6.0	None

☆ U.S. GOVERNMENT PRINTING OFFICE : 1987 0 - 493-532 : QL 3

Accessibility Statement

This document is not accessible by screen-reader software. The Natural Resources Conservation Service (NRCS) is committed to making its information accessible to all of its customers and employees. If you are experiencing accessibility issues and need assistance, please contact our Helpdesk by phone at 1-800-457-3642 or by e-mail at ServiceDesk-FTC@ftc.usda.gov. For assistance with publications that include maps, graphs, or similar forms of information, you may also wish to contact our State or local office. You can locate the correct office and phone number at http://offices.sc.egov.usda.gov/locator/app.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410, or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.



LEGEND

SOILS THAT ARE LOAMY; ON FLOOD PLAINS

1 Commerce-Bruin: Level to gently undulating, somewhat poorly drained and moderately well drained soils that are loamy throughout; formed in young Mississippi River alluvium

2 Dundee-Baldwin: Level, somewhat poorly drained and poorly drained soils that have a loamy surface layer and a loamy or a clayey and loamy subsoil; formed in old Mississippi River alluvium

SOILS THAT ARE CLAYEY OR LOAMY; ON FLOOD PLAINS

3 Alligator-Tensas-Dundee: Level to undulating, poorly drained and somewhat poorly drained soils that have a clayey or loamy surface layer and a clayey or loamy or a clayey and loamy subsoil; formed in old Mississippi River alluvium

4 Sharkey-Tunica: Level to gently undulating, poorly drained soils that have a clayey or loamy surface layer and a clayey subsoil; formed in young Mississippi River alluvium

SOILS THAT ARE CLAYEY AND LOAMY AND ARE SUBJECT TO FLOODING; ON FLOOD PLAINS

5 Commerce-Bruin-Newellton: Level to undulating, somewhat poorly drained and moderately well drained soils that have a loamy or clayey surface layer and a loamy or a clayey and loamy subsoil; formed in young Mississippi River alluvium

6 Sharkey-Fausse: Level, poorly drained and very poorly drained soils that are clayey throughout; formed in young Mississippi River alluvium

7 Sharkey-Alligator-Tensas: Level to undulating, poorly drained and somewhat poorly drained soils that have a clayey surface layer and a clayey or clayey and loamy subsoil; formed in young and old Mississippi River alluvium

8 Norwood-Latanier: Gently undulating; well drained and somewhat poorly drained soils that have a loamy or clayey surface layer and a loamy or clayey and loamy subsoil; formed in Red River alluvium

*The texture given in the descriptive heading refers to the texture of the surface layer of the major soils in each map unit.

COMPILED 1986

SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
LOUISIANA AGRICULTURAL EXPERIMENT STATION
LOUISIANA SOIL AND WATER CONSERVATION COMMITTEE

GENERAL SOIL MAP

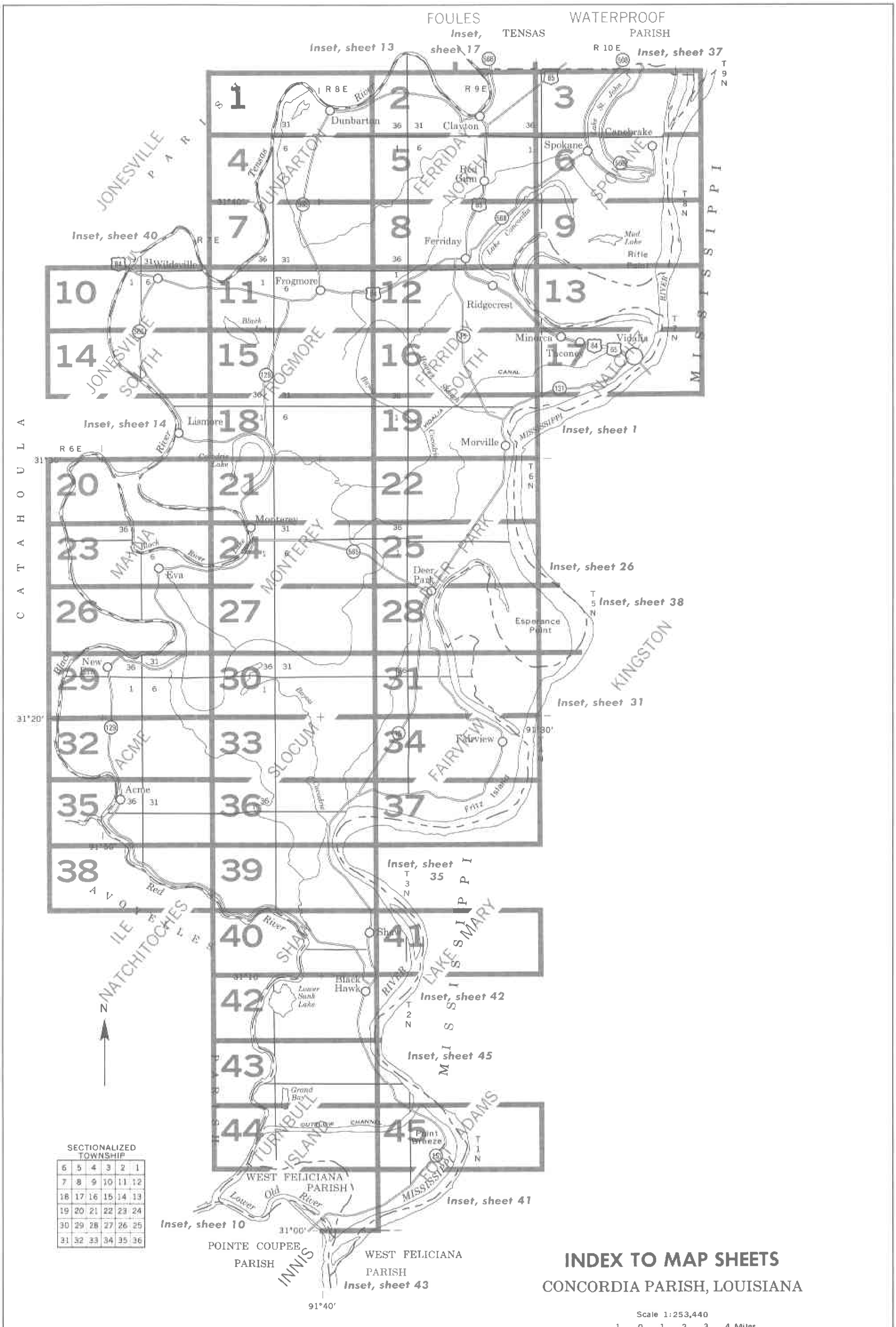
CONCORDIA PARISH, LOUISIANA

Scale 1:253,440

1 0 1 2 3 4 Miles

1 0 4 8 Km

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.



INDEX TO MAP SHEETS

CONCORDIA PARISH, LOUISIANA

Scale 1:253,440

1 0 1 2 3 4 Miles

1 0 4 8 Km

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

CONCORDIA PARISH, LOUISIANA

LOUISIANA AGRICULTURAL EXPERIMENT STATION
LOUISIANA SOIL AND WATER CONSERVATION COMMITTEE

SOIL LEGEND

The first letter, always a capital, is the initial letter of the soil name. The second letter is a capital if the mapping unit is broadly defined 1/; otherwise, it is small letter.

1/ The composition of these units is more variable than that of others in the survey area but has been controlled well enough to be interpreted for the expected use of the soils.

SYMBOL	NAME
Aa	Alligator clay
Ab	Alligator clay, occasionally flooded
Ac	Alligator clay, gently undulating, occasionally flooded
Ba	Baldwin silty clay loam
Bn	Bruin silt loam
Br	Bruin silt loam, gently undulating
Bu	Bruin silt loam, occasionally flooded
Bw	Bruin-Tunica complex, gently undulating
Ca	Commerce silt loam
Cb	Commerce silty clay loam
Cc	Commerce silty clay loam, occasionally flooded
Cm	Commerce silt clay loam
Co	Commerce silt clay loam, occasionally flooded
CR	Commerce and Bruin soils, frequently flooded
Cv	Crevasse fine sand, frequently flooded
Dd	Dundee loam
De	Dundee silty clay loam
Dh	Dundee-Alligator-Tensas complex, gently undulating
Ds	Dundee-Alligator-Tensas complex, undulating
Fa	Fausse clay
La	Latanier clay, gently undulating, occasionally flooded
Ne	Newellton clay
NS	Newellton and Sharkey soils, frequently flooded
Nw	Norwood silt loam, gently undulating, occasionally flooded
Sa	Sharkey silt loam
Sh	Sharkey clay
Sk	Sharkey clay, occasionally flooded
Sm	Sharkey clay, gently undulating, occasionally flooded
So	Sharkey clay, frequently flooded
Sr	Sharkey clay, overwash, occasionally flooded
SS	Sostien-Cocodrie association, occasionally flooded
ST	Sostien-Crevasse association, 0 to 5 percent slopes
Tc	Tensas silty clay
Te	Tensas silty clay, occasionally flooded
To	Tensas-Alligator complex, undulating
Tr	Tensas-Alligator complex, undulating, occasionally flooded
Ts	Tunica clay
Tt	Tunica clay, occasionally flooded
Tu	Tunica-Sharkey complex, gently undulating
Ty	Tunica-Sharkey complex, gently undulating, occasionally flooded

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES	
National, state or province	——— – –
County or parish	——— –
Minor civil division	— — —
Reservation (national forest or park, state forest or park, and large airport)	—— · ——
Land grant	—— · · ——
Limit of soil survey (label)	———
Field sheet matchline and neatline	———
AD HOC BOUNDARY (label)	Swift Airport
Small airport, airfield, park, oilfield, cemetery, or flood pool	FLOOD POOL LINE
STATE COORDINATE TICK	—┴—
LAND DIVISION CORNER (sections and land grants)	└ ┴ ┼ ┼
ROADS	
Divided (median shown if scale permits)	═══
Other roads	———
Trail	– – – –
ROAD EMBLEM & DESIGNATIONS	
Interstate	21
Federal	173
State	28
County, farm or ranch	1283
RAILROAD	—┼—┼—┼—
POWER TRANSMISSION LINE (normally not shown)	········
PIPE LINE (normally not shown)	├─┤├─┤
FENCE (normally not shown)	—×——×—
LEVEES	
Without road	|||||||||||
With road	|||||||||||
With railroad	|||||||||||
DAMS	
Large (to scale)	⬭
Medium or Small	water w
PITS	
Gravel pit	⚒
Mine or quarry	⚒

MISCELLANEOUS CULTURAL FEATURES	
Farmstead, house (omit in urban areas)	▪
Church	♁
School	♁
Indian mound (label)	⌒ Indian Mound
Located object (label)	○ Tower
Tank (label)	● Gas
Wells, oil or gas	♁
Windmill	✕
Kitchen midden	⌓

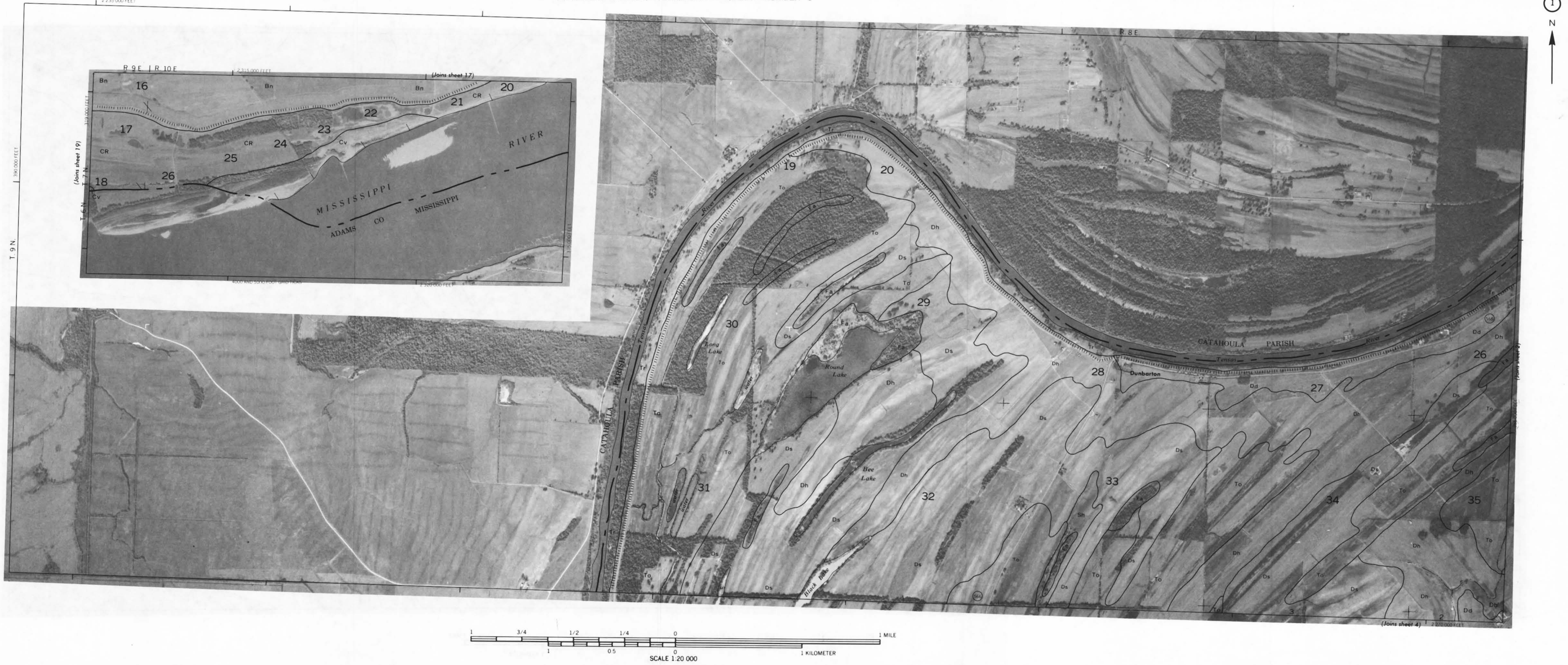
WATER FEATURES

DRAINAGE	
Perennial, double line	≈
Perennial, single line	∼
Intermittent	– · · –
Drainage end	∼ · · →
Canals or ditches	
Double-line (label)	CANAL
Drainage and/or irrigation	→· →
LAKES, PONDS AND RESERVOIRS	
Perennial	water w
Intermittent	int i
MISCELLANEOUS WATER FEATURES	
Marsh or swamp	⩋
Spring	o~
Well, artesian	◆
Well, irrigation	-o-
Wet spot	↓

SPECIAL SYMBOLS FOR SOIL SURVEY

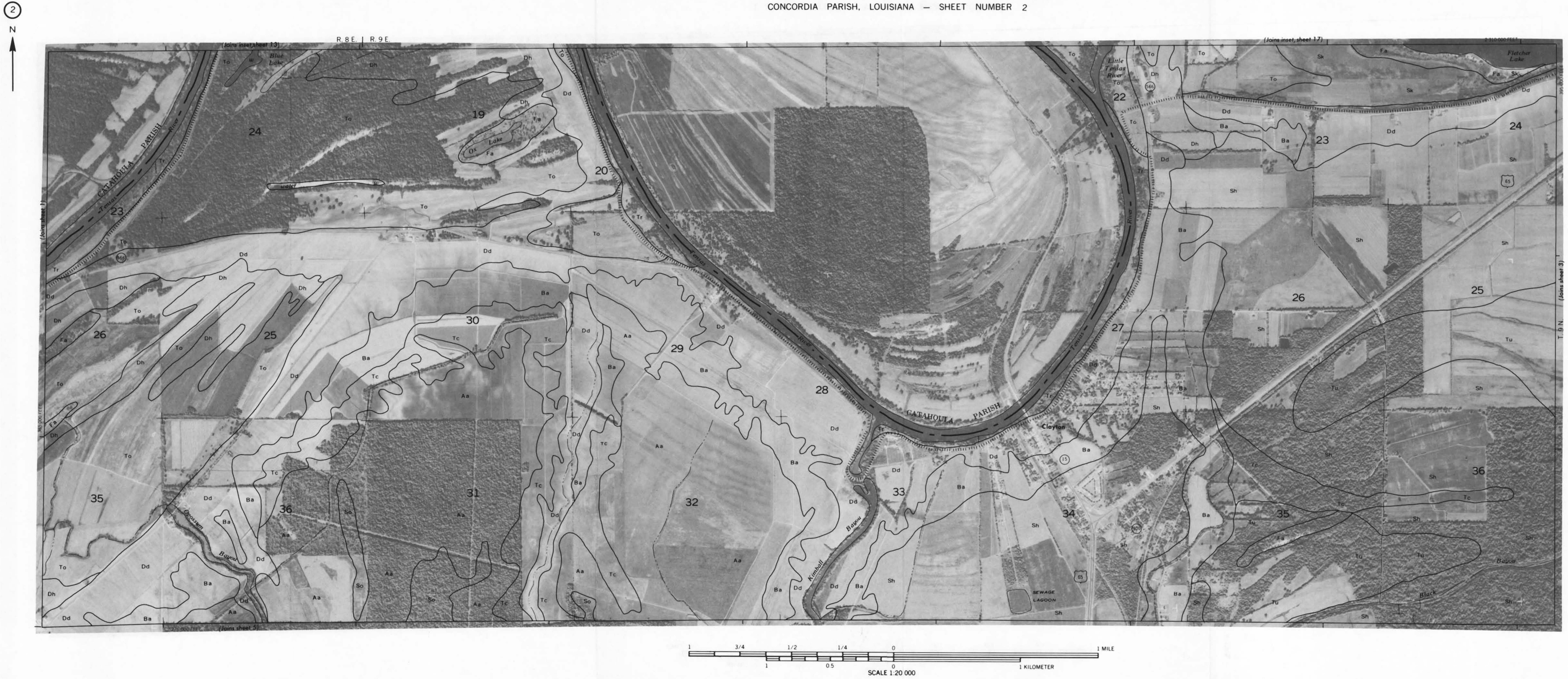
SOIL DELINEATIONS AND SYMBOLS	ST La
ESCARPMENTS	
Bedrock (points down slope)	vvvvvvvvvvvvvvvvv
Other than bedrock (points down slope)	'''''''''''''''''''''''''
SHORT STEEP SLOPE	....
GULLY	∿∿∿∿∿∿
DEPRESSION OR SINK	◊
SOIL SAMPLE (normally not shown)	Ⓢ
MISCELLANEOUS	
Blowout	◡
Clay spot	※
Gravelly spot	∘∘
Gumbo, slick or scabby spot (sodic)	∅
Dumps and other similar non soil areas	≋
Prominent hill or peak	☼
Rock outcrop (includes sandstone and shale)	▾
Saline spot	+
Sandy spot	∷
Severely eroded spot	≑
Slide or slip (tips point upslope)	⟩⟩
Stony spot, very stony spot	0 ∞

CONCORDIA PARISH, LOUISIANA — SHEET NUMBER 1



CONCORDIA PARISH, LOUISIANA NO. 1

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



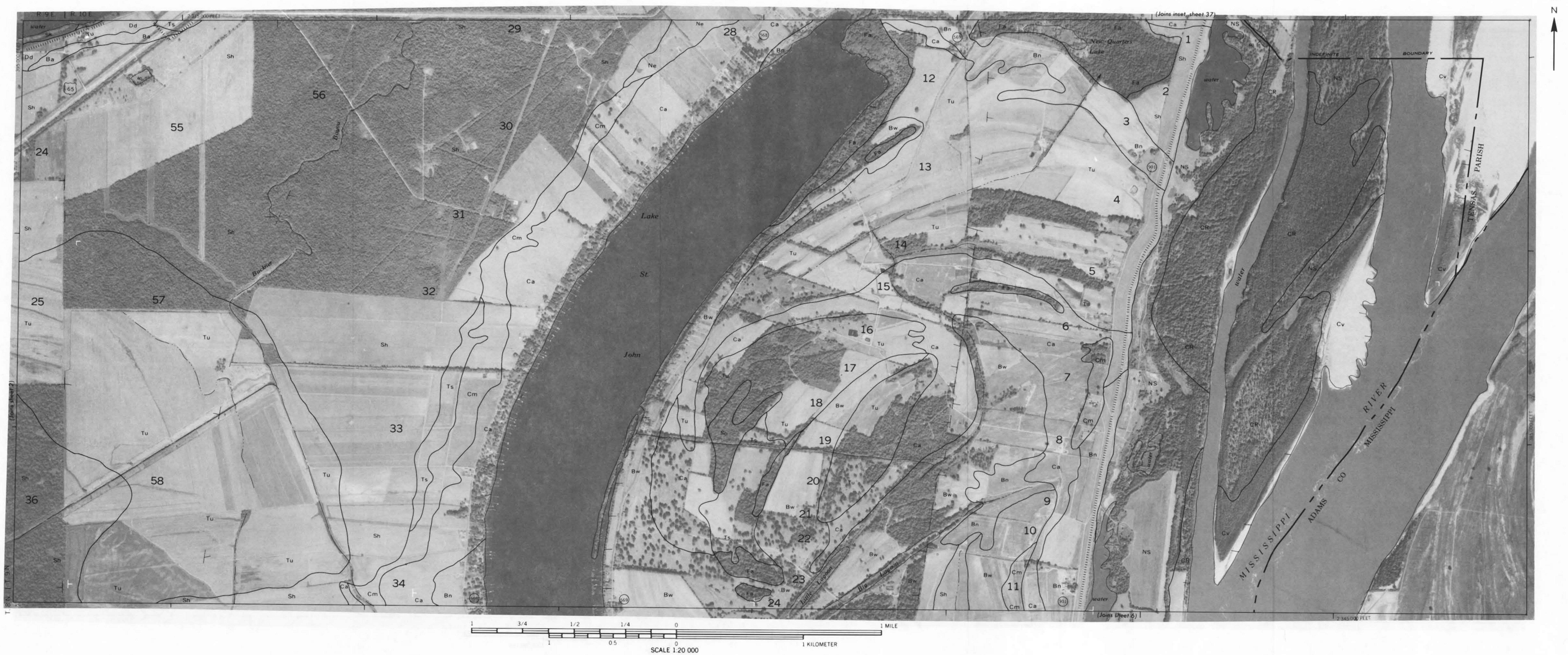
SCALE 1:20 000

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CONCORDIA PARISH, LOUISIANA NO. 2

CONCORDIA PARISH, LOUISIANA NO. 3

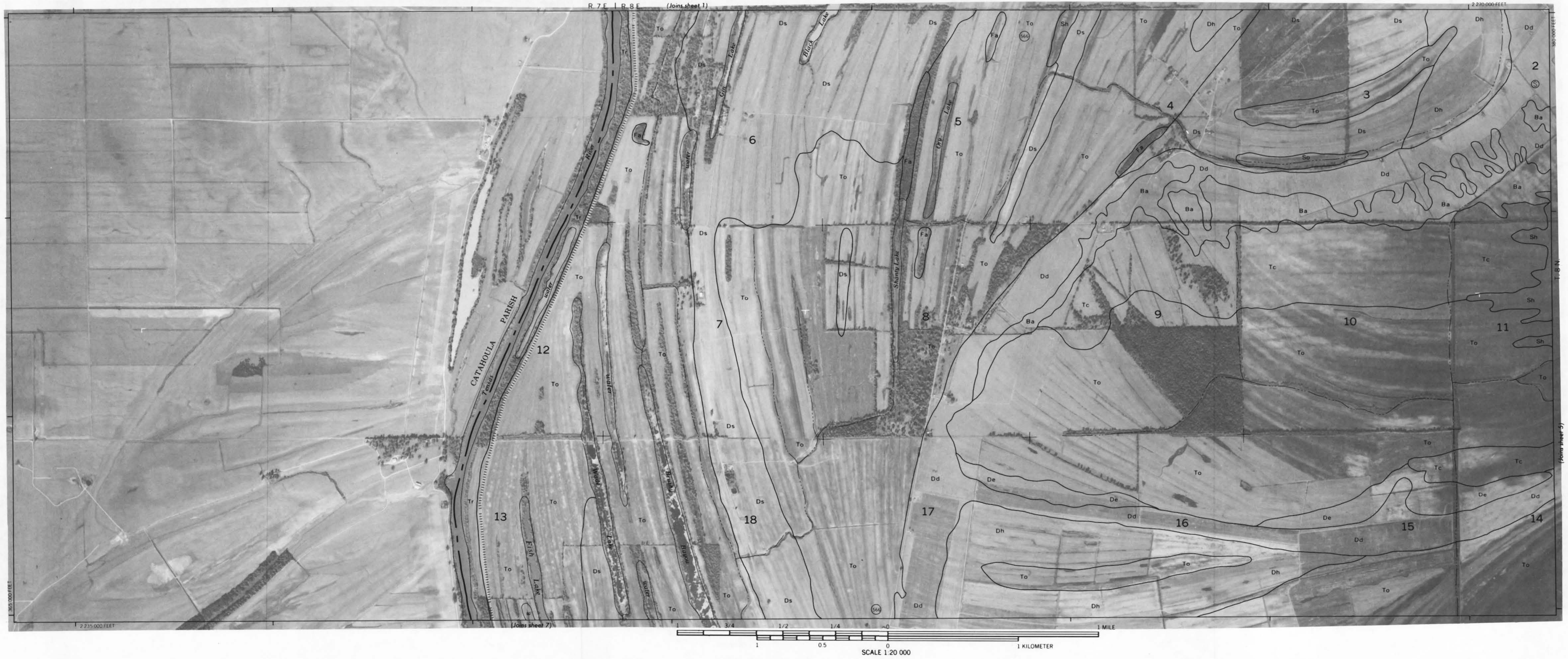
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



④

N

CONCORDIA PARISH, LOUISIANA — SHEET NUMBER 4



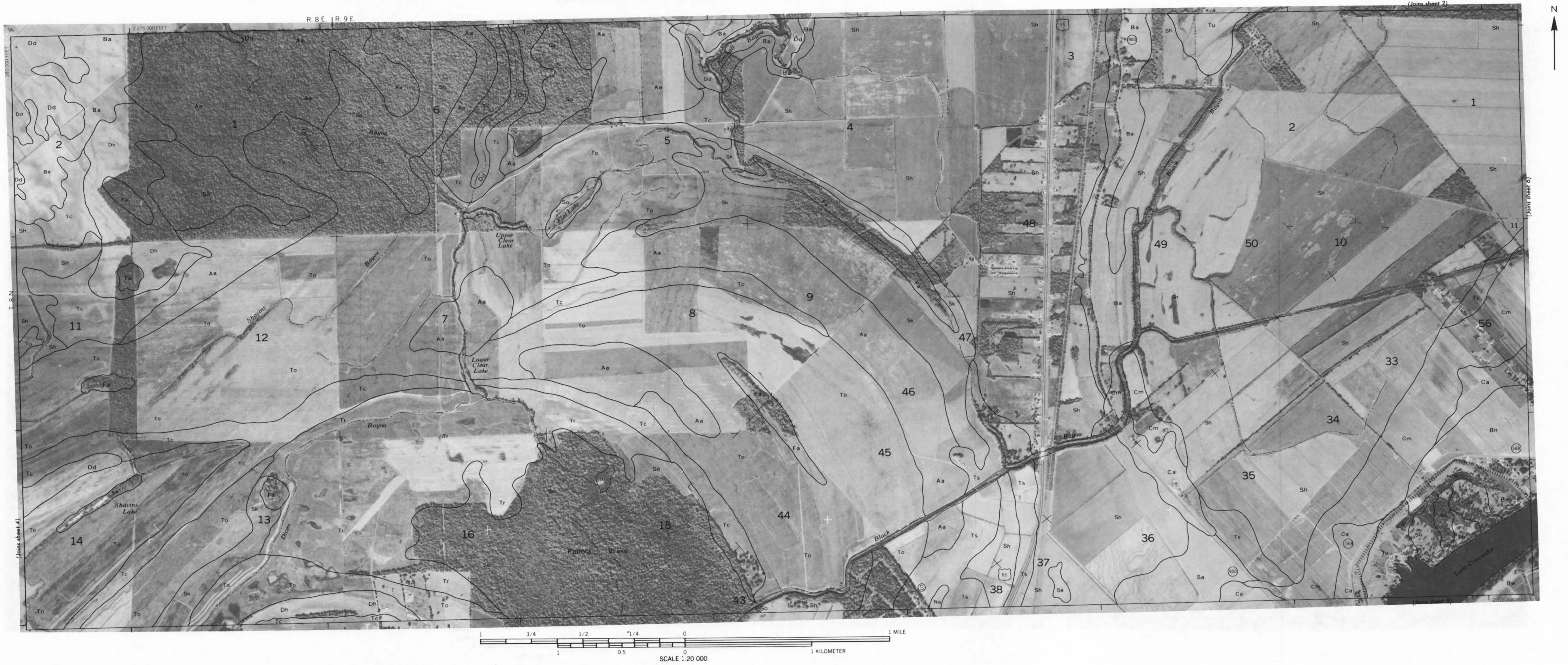
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CONCORDIA PARISH, LOUISIANA NO. 4

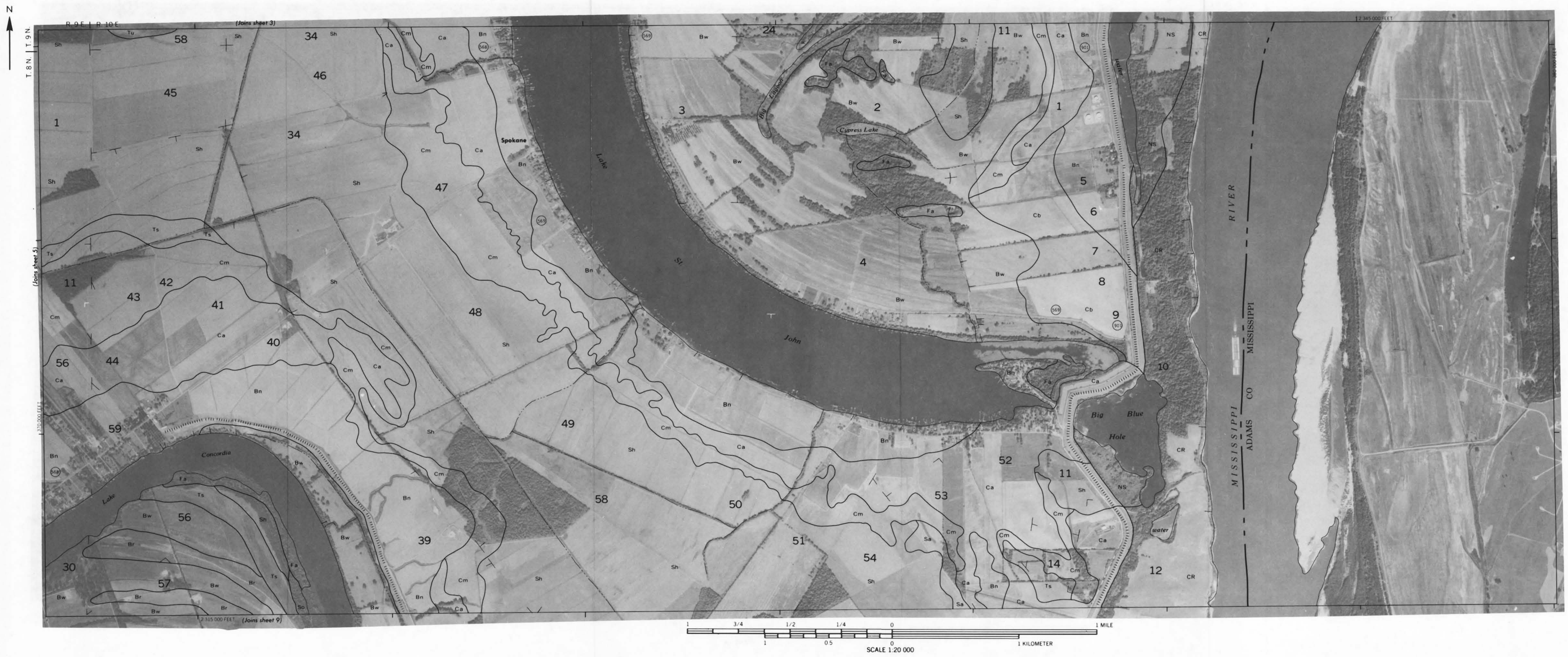
CONCORDIA PARISH, LOUISIANA — SHEET NUMBER 5

CONCORDIA PARISH, LOUISIANA NO. 5

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



CONCORDIA PARISH, LOUISIANA — SHEET NUMBER 6

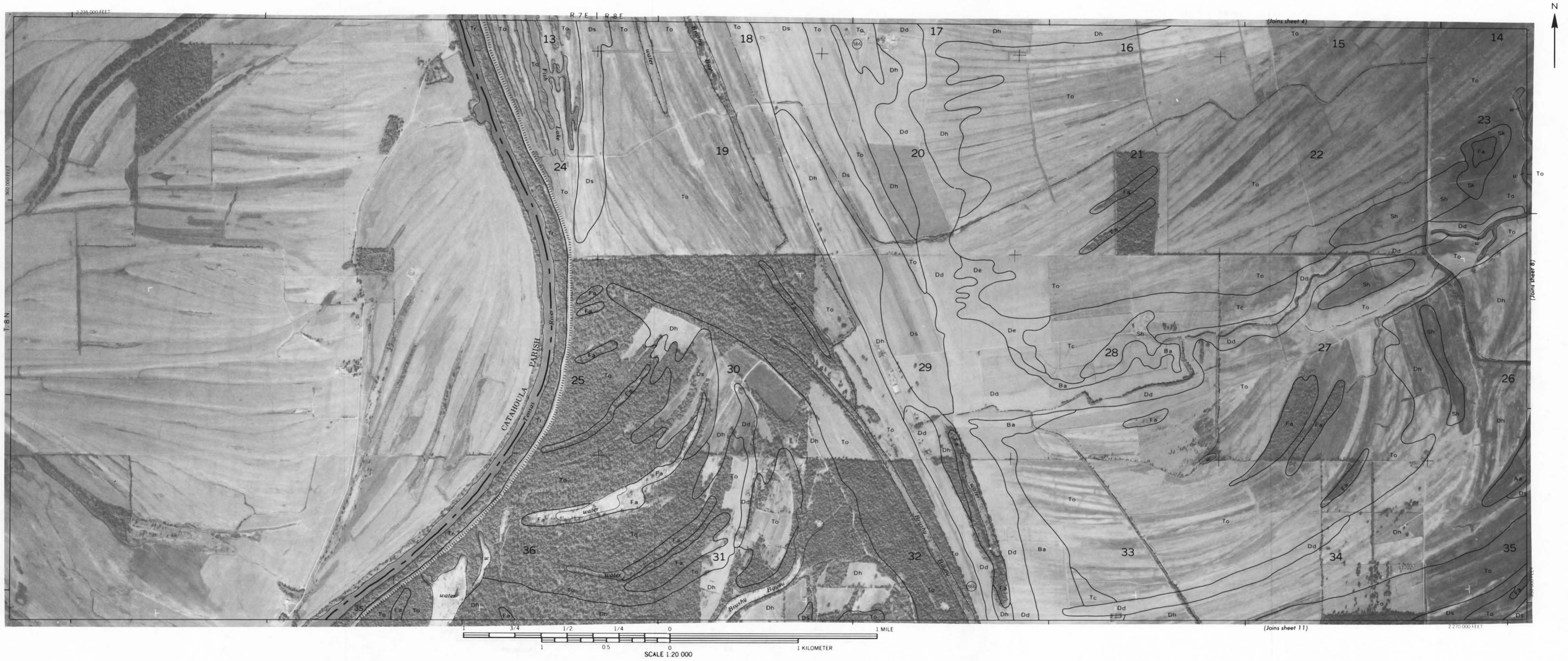


This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

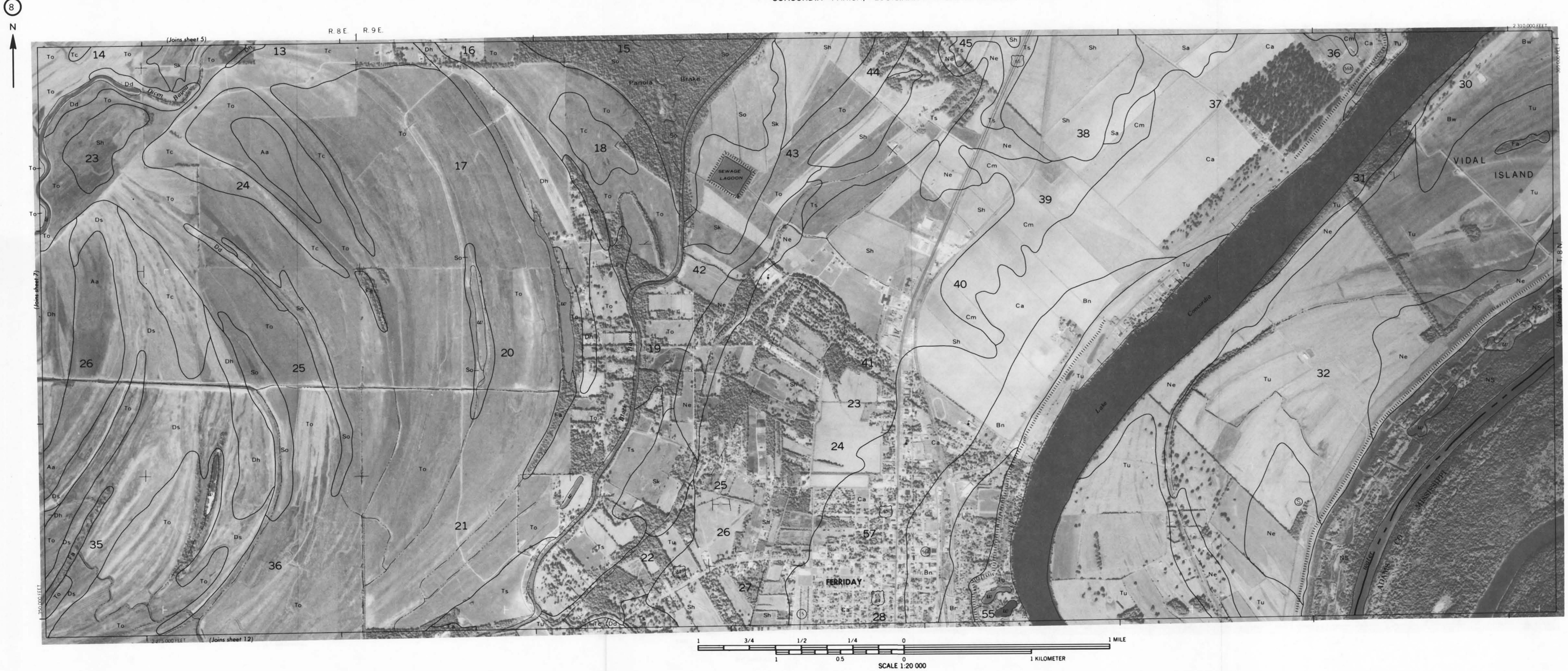
CONCORDIA PARISH, LOUISIANA NO. 6

CONCORDIA PARISH, LOUISIANA NO. 7

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



CONCORDIA PARISH, LOUISIANA — SHEET NUMBER 8

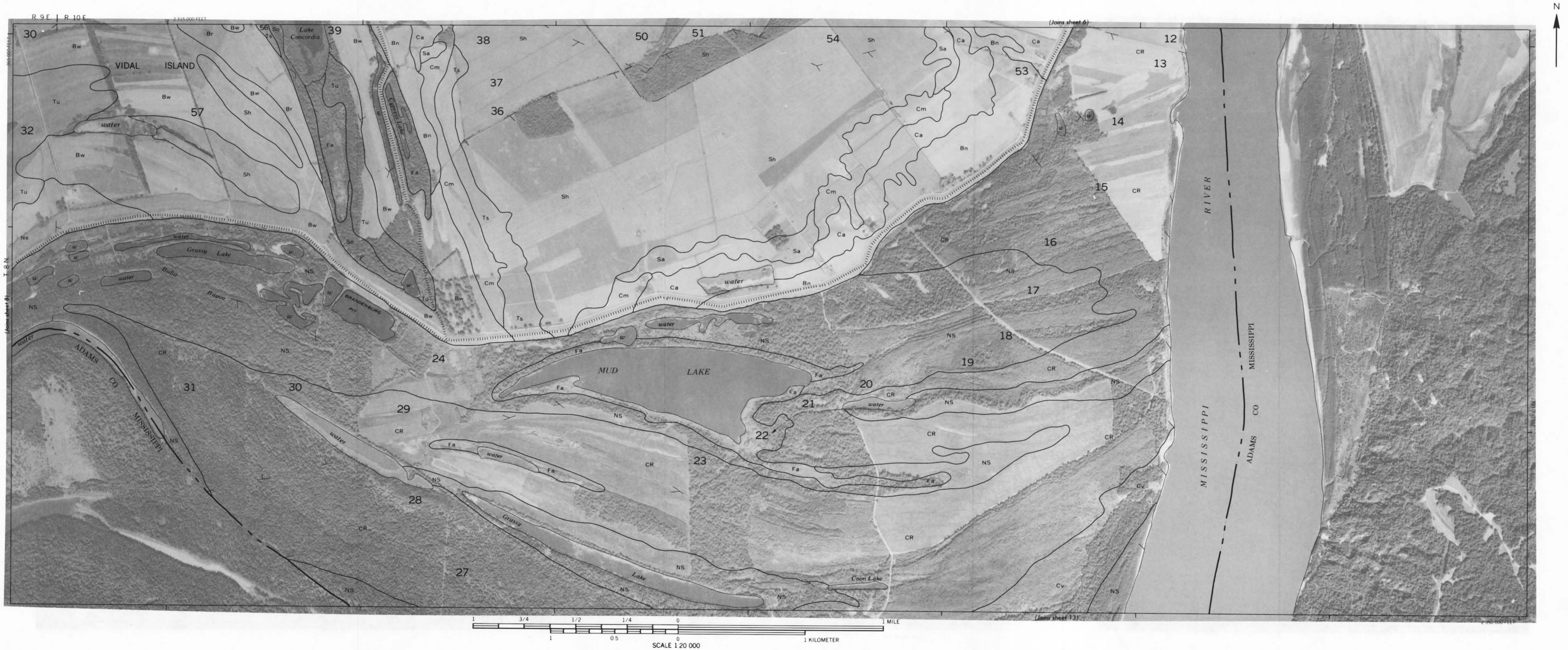


This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CONCORDIA PARISH, LOUISIANA NO. 8

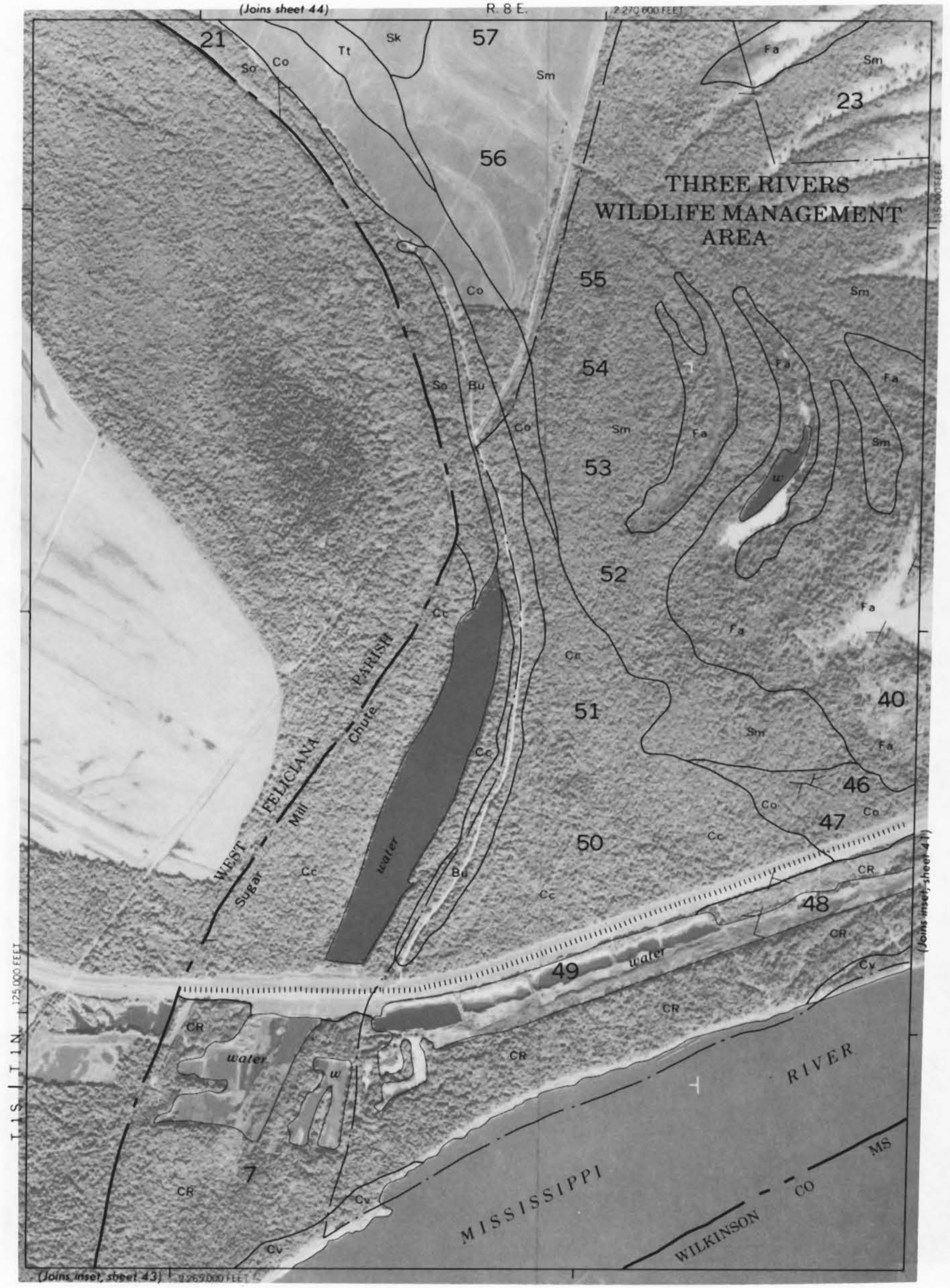
CONCORDIA PARISH, LOUISIANA NO. 9

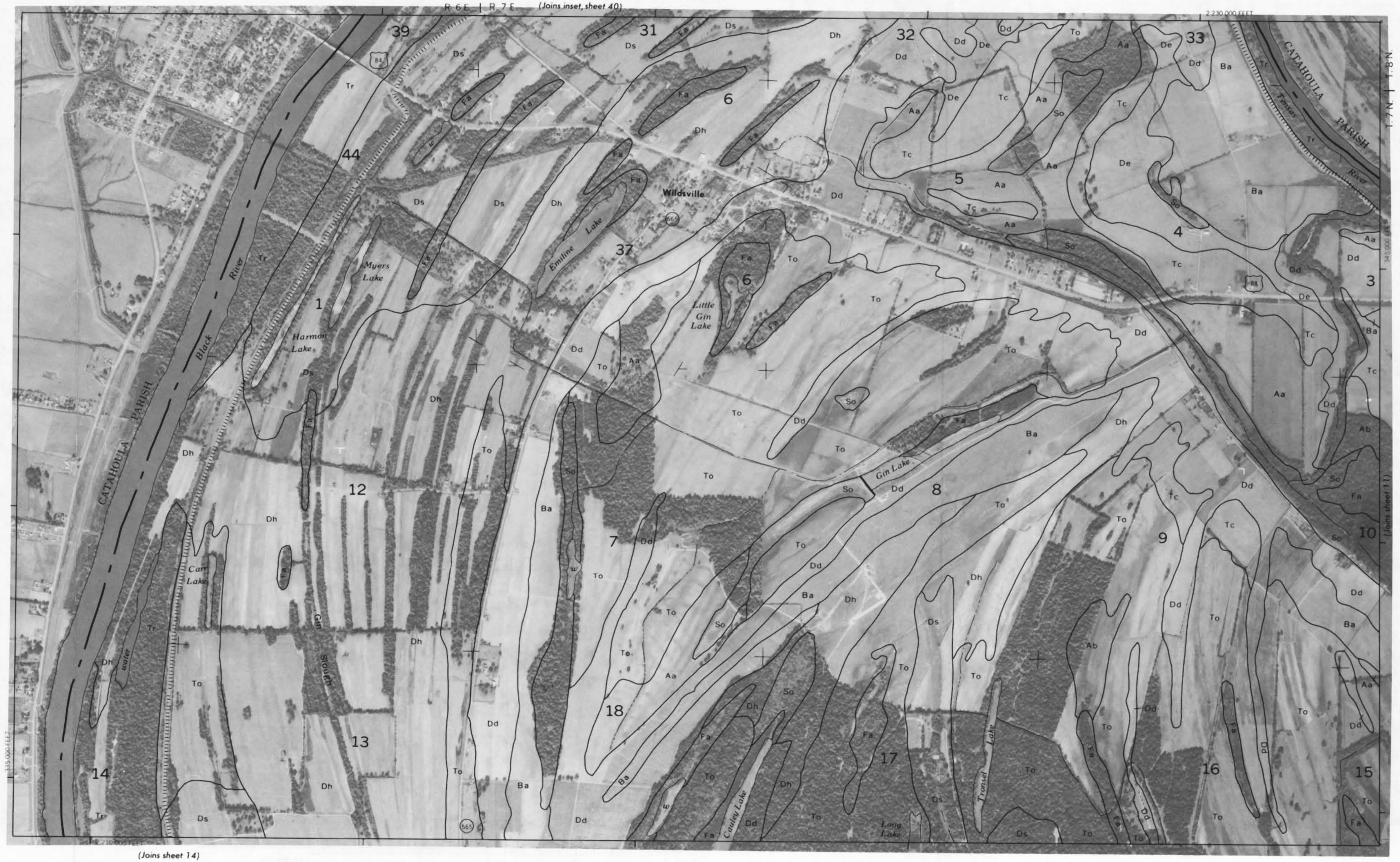
This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



N

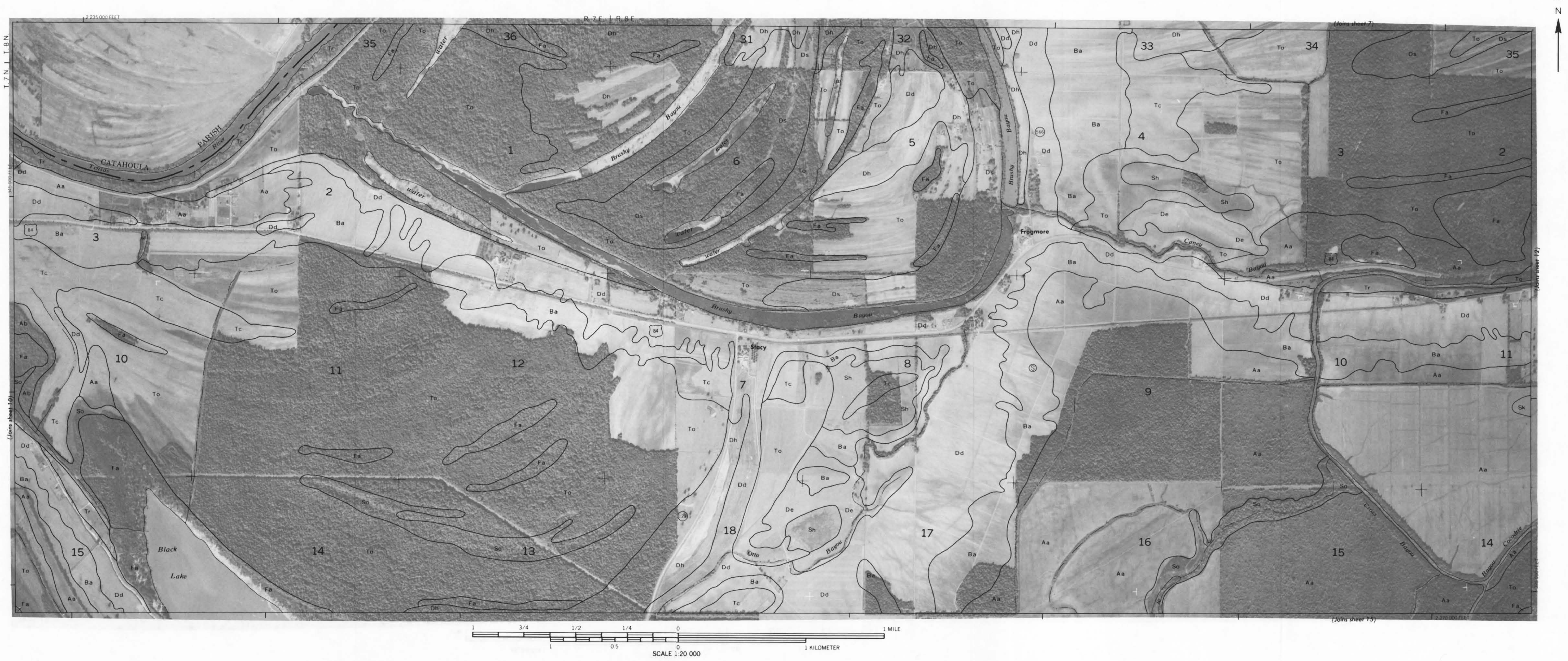
CONCORDIA PARISH, LOUISIANA — SHEET NUMBER 10





This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CONCORDIA PARISH, LOUISIANA — SHEET NUMBER 11

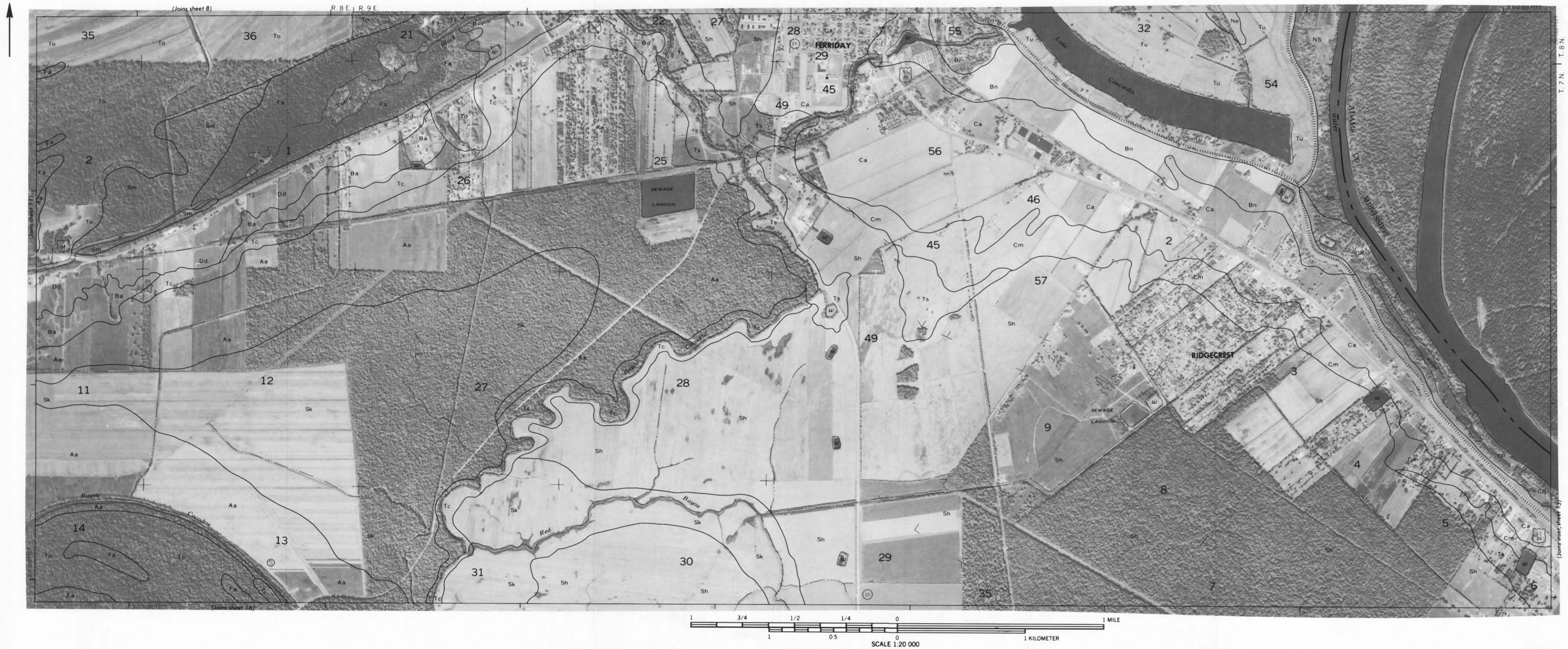


CONCORDIA PARISH, LOUISIANA NO. 11

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

⑫

CONCORDIA PARISH, LOUISIANA — SHEET NUMBER 12

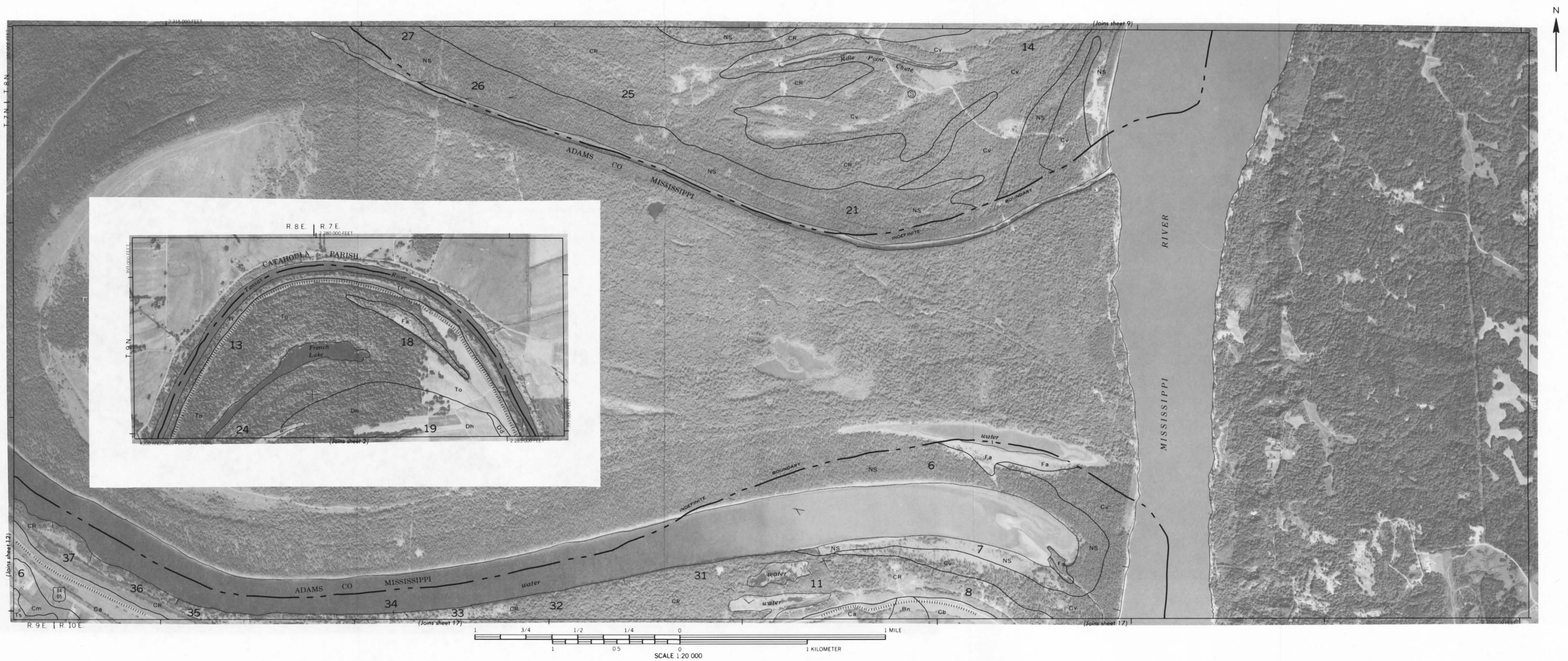


This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

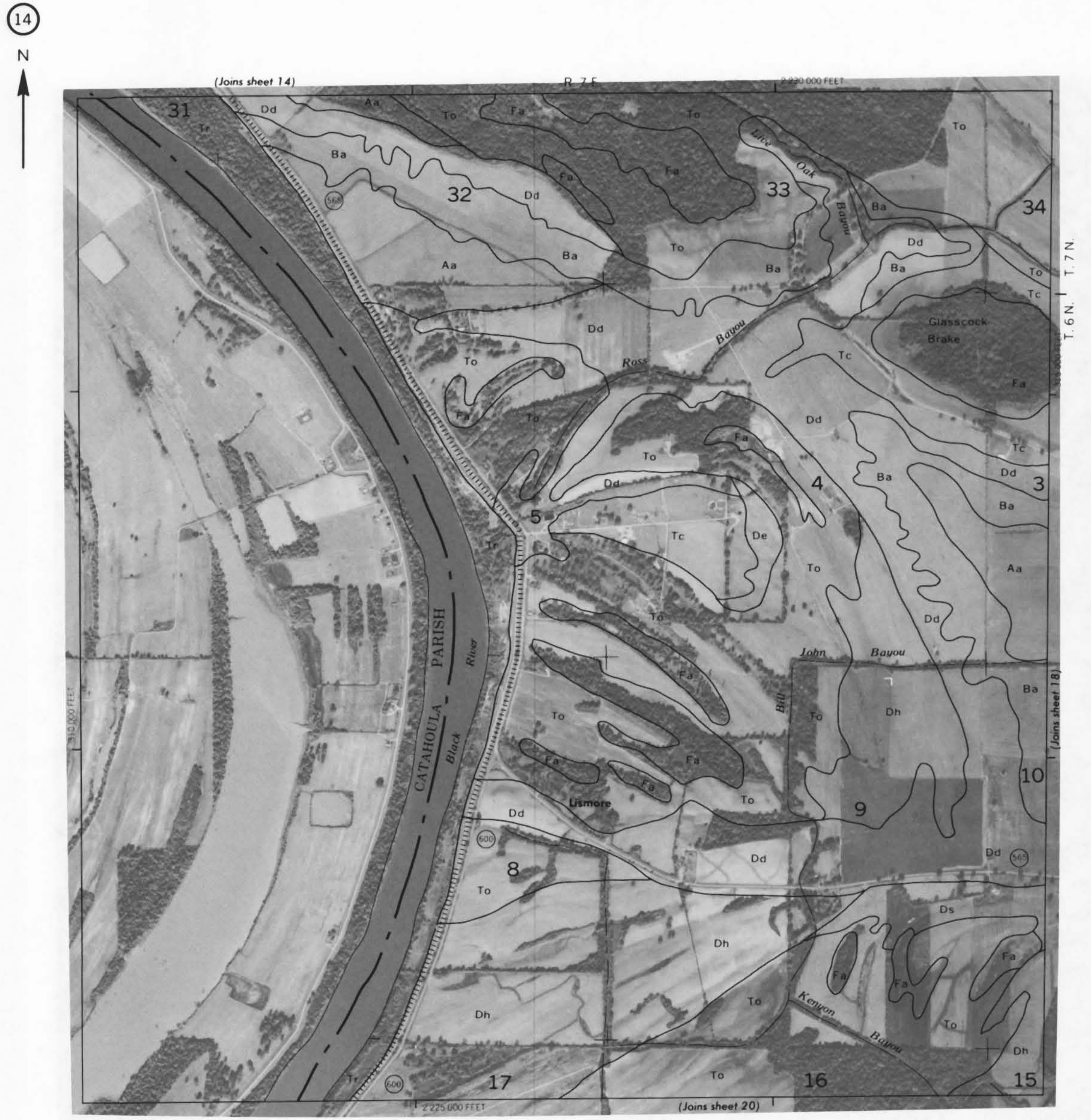
CONCORDIA PARISH, LOUISIANA NO. 12

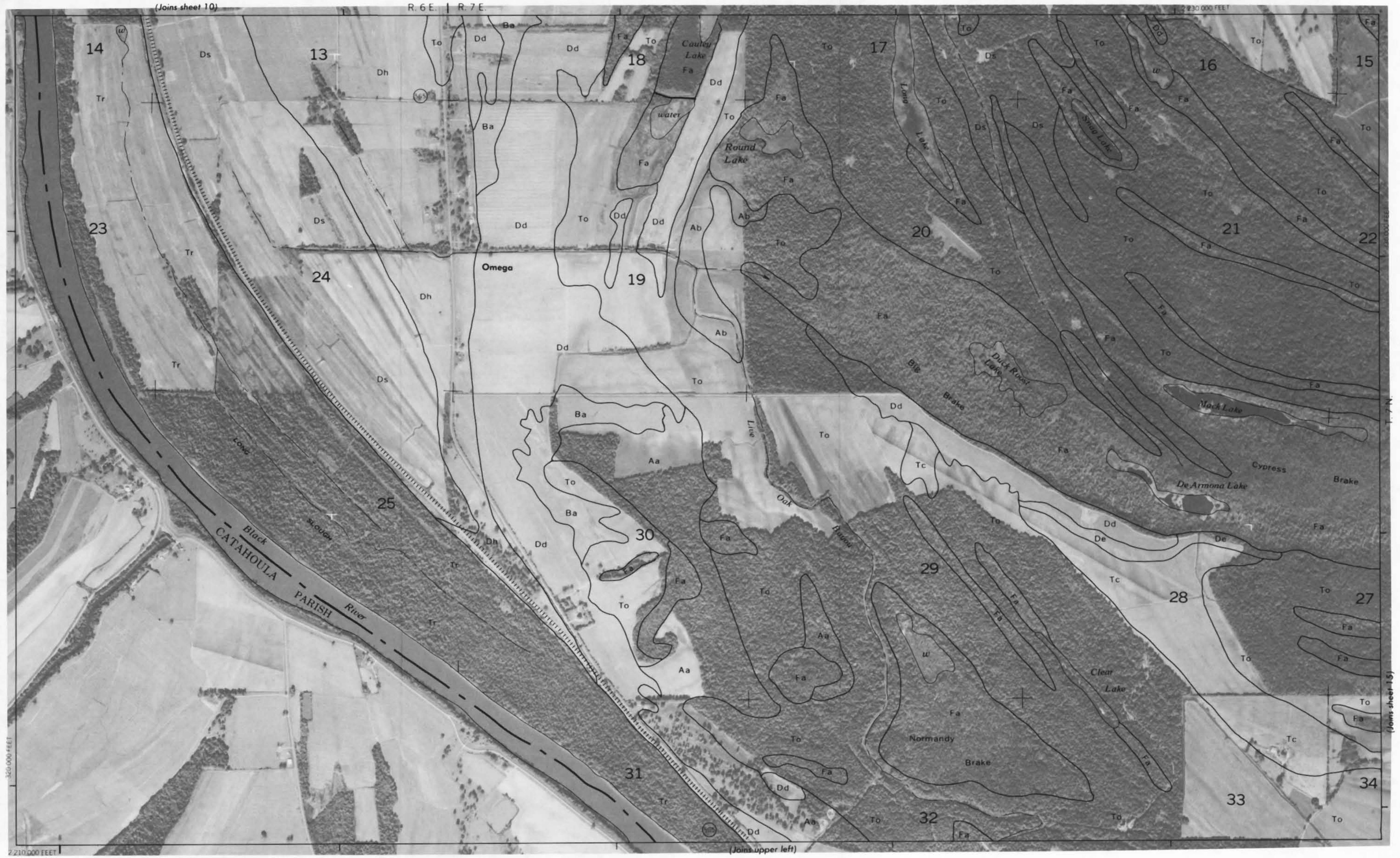
CONCORDIA PARISH, LOUISIANA NO. 13

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



CONCORDIA PARISH, LOUISIANA — SHEET NUMBER 14





This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

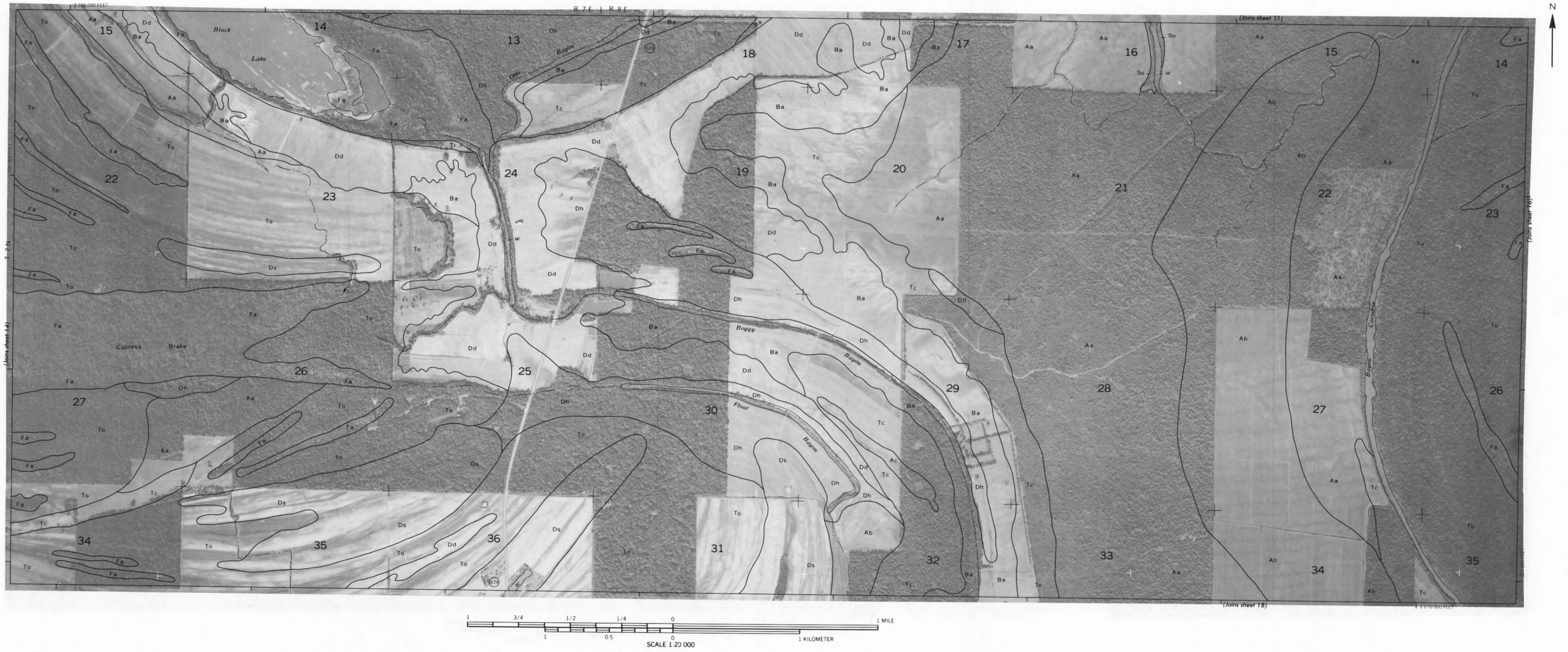
CONCORDIA PARISH, LOUISIANA NO. 14

CONCORDIA PARISH, LOUISIANA — SHEET NUMBER 15

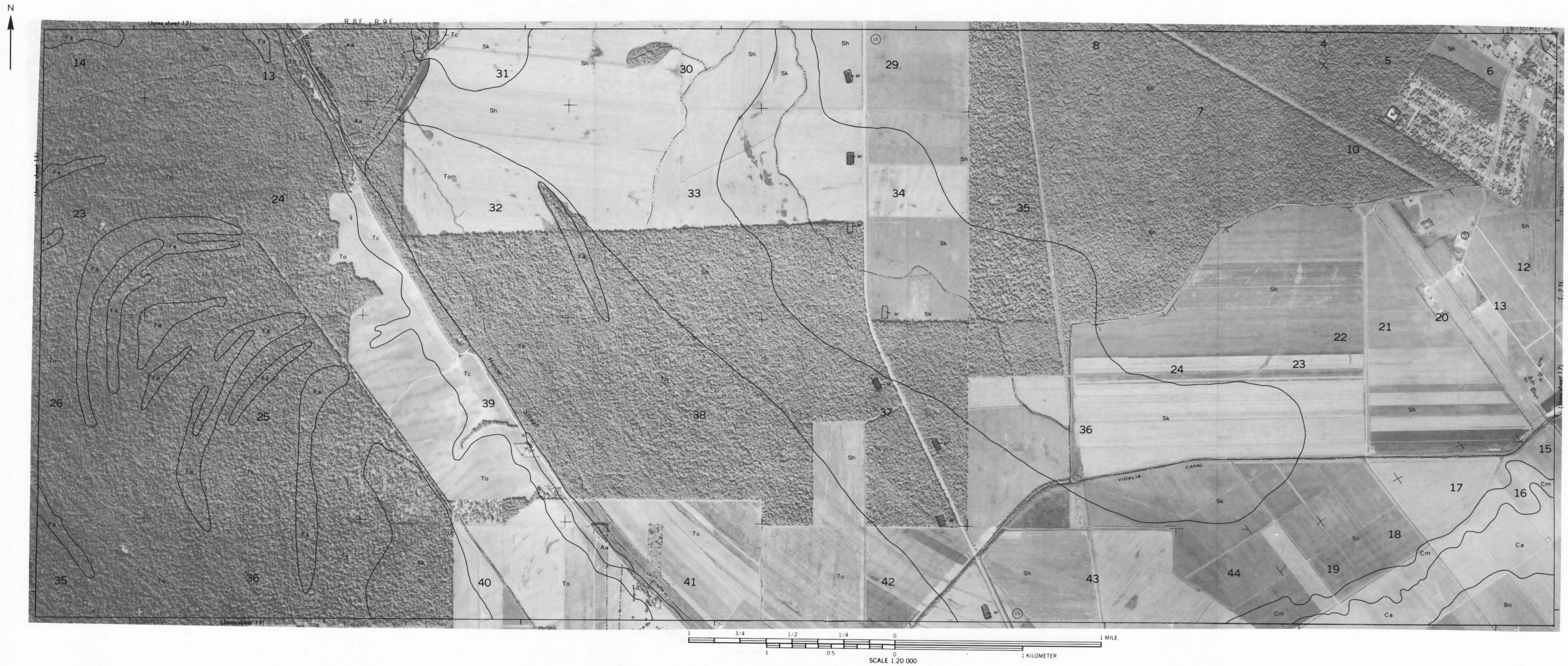
⑮

CONCORDIA PARISH, LOUISIANA NO. 15

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



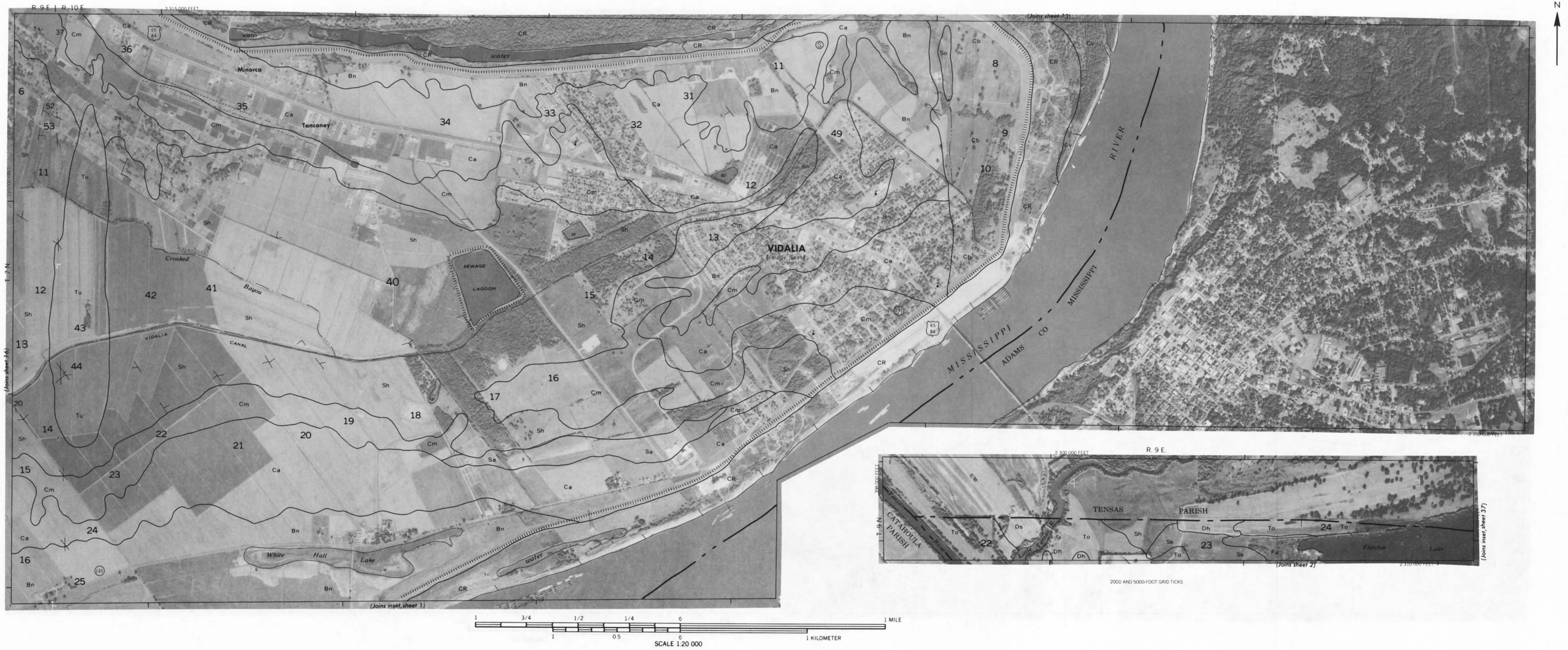
CONCORDIA PARISH, LOUISIANA — SHEET NUMBER 16



This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CONCORDIA PARISH, LOUISIANA NO. 16

CONCORDIA PARISH, LOUISIANA — SHEET NUMBER 17



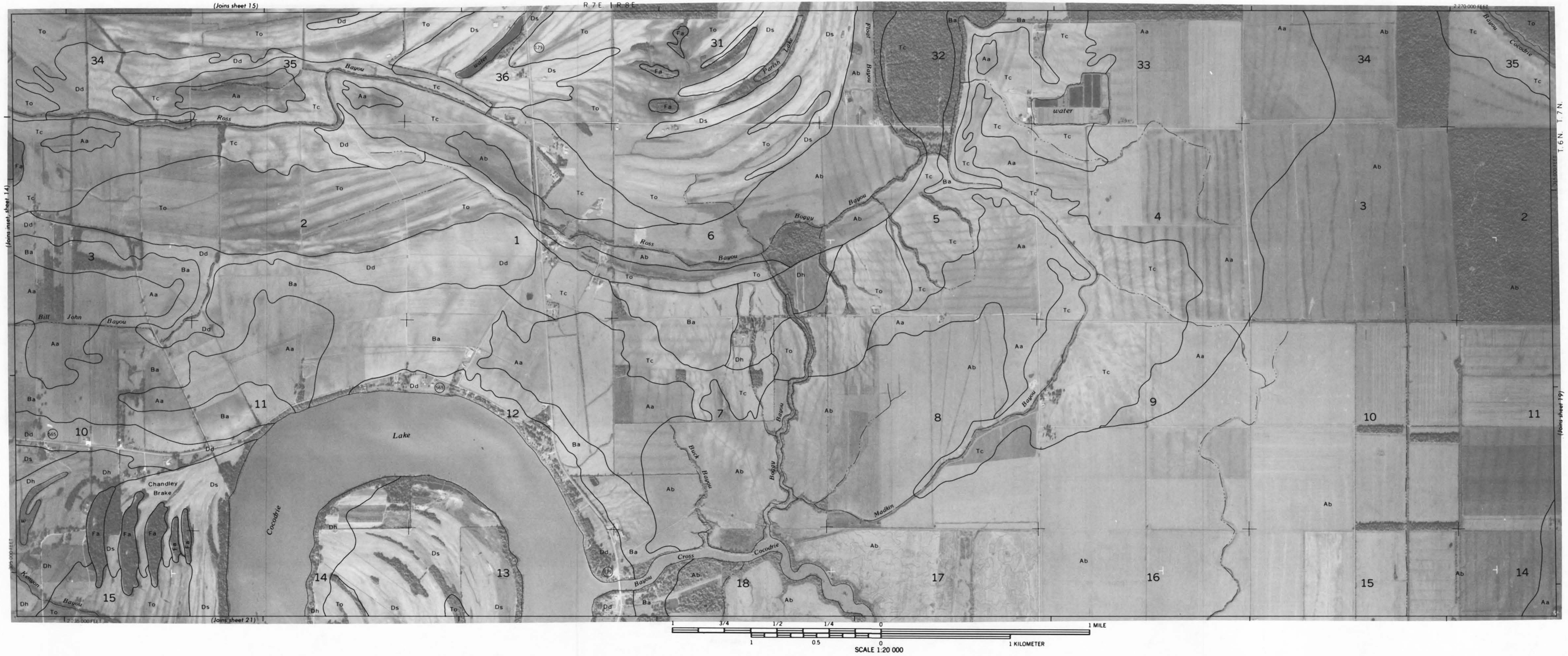
CONCORDIA PARISH, LOUISIANA NO. 17

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

18

N

CONCORDIA PARISH, LOUISIANA — SHEET NUMBER 18

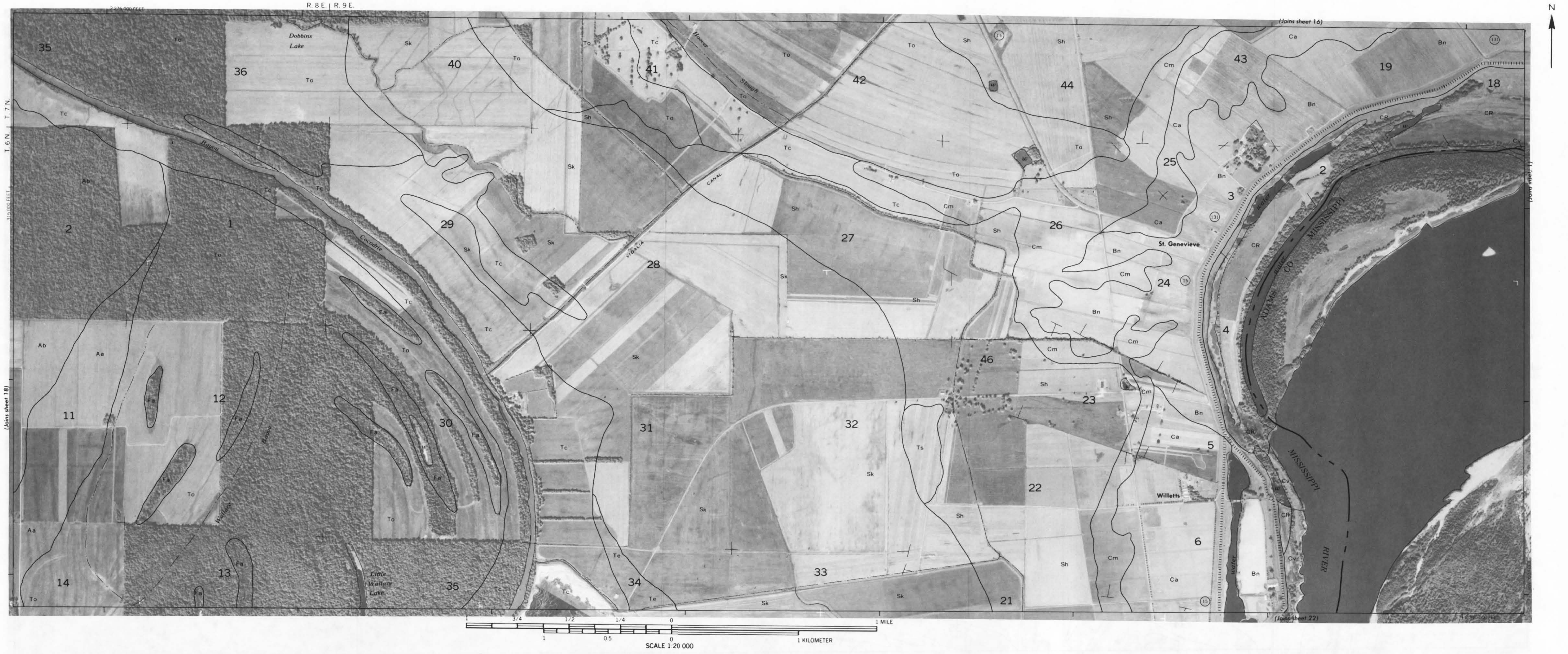


This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

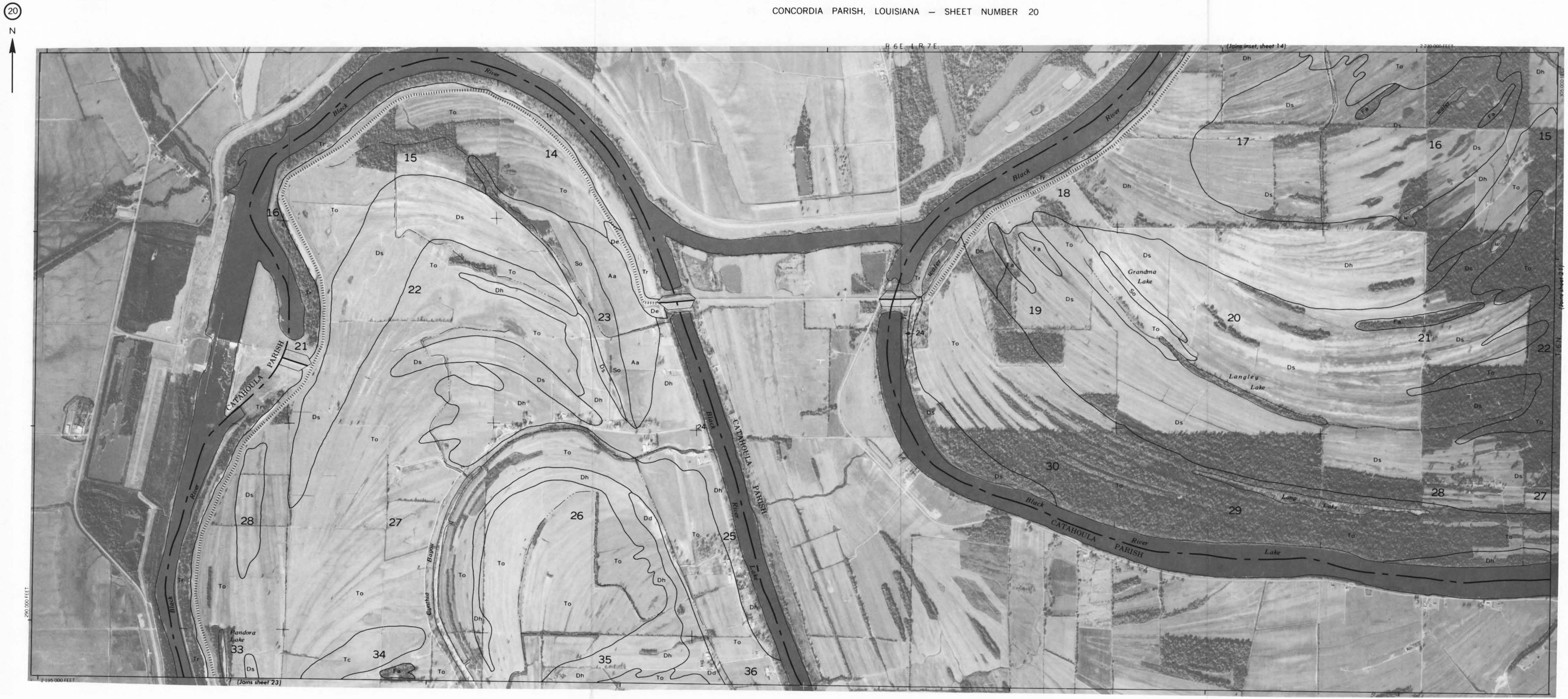
CONCORDIA PARISH, LOUISIANA NO. 18

CONCORDIA PARISH, LOUISIANA NO. 19

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



CONCORDIA PARISH, LOUISIANA — SHEET NUMBER 20



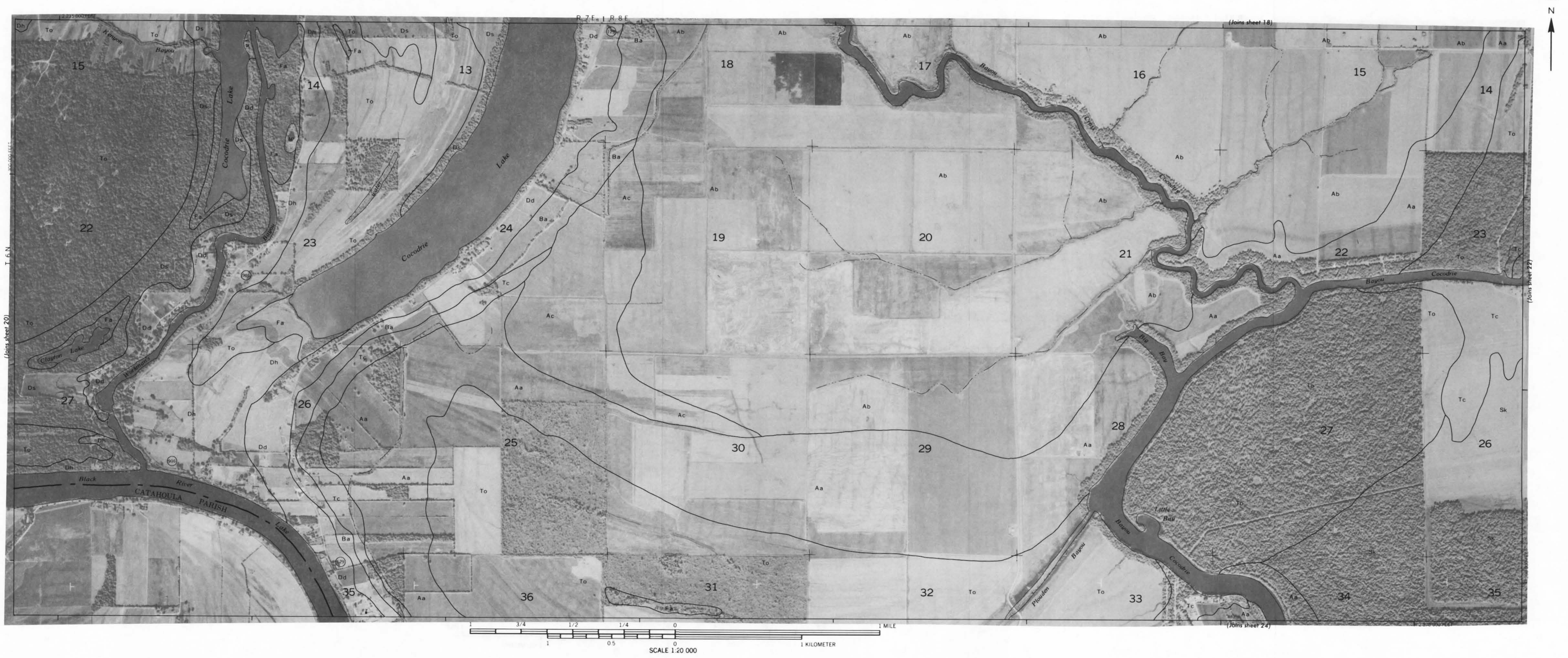
This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CONCORDIA PARISH, LOUISIANA NO. 20

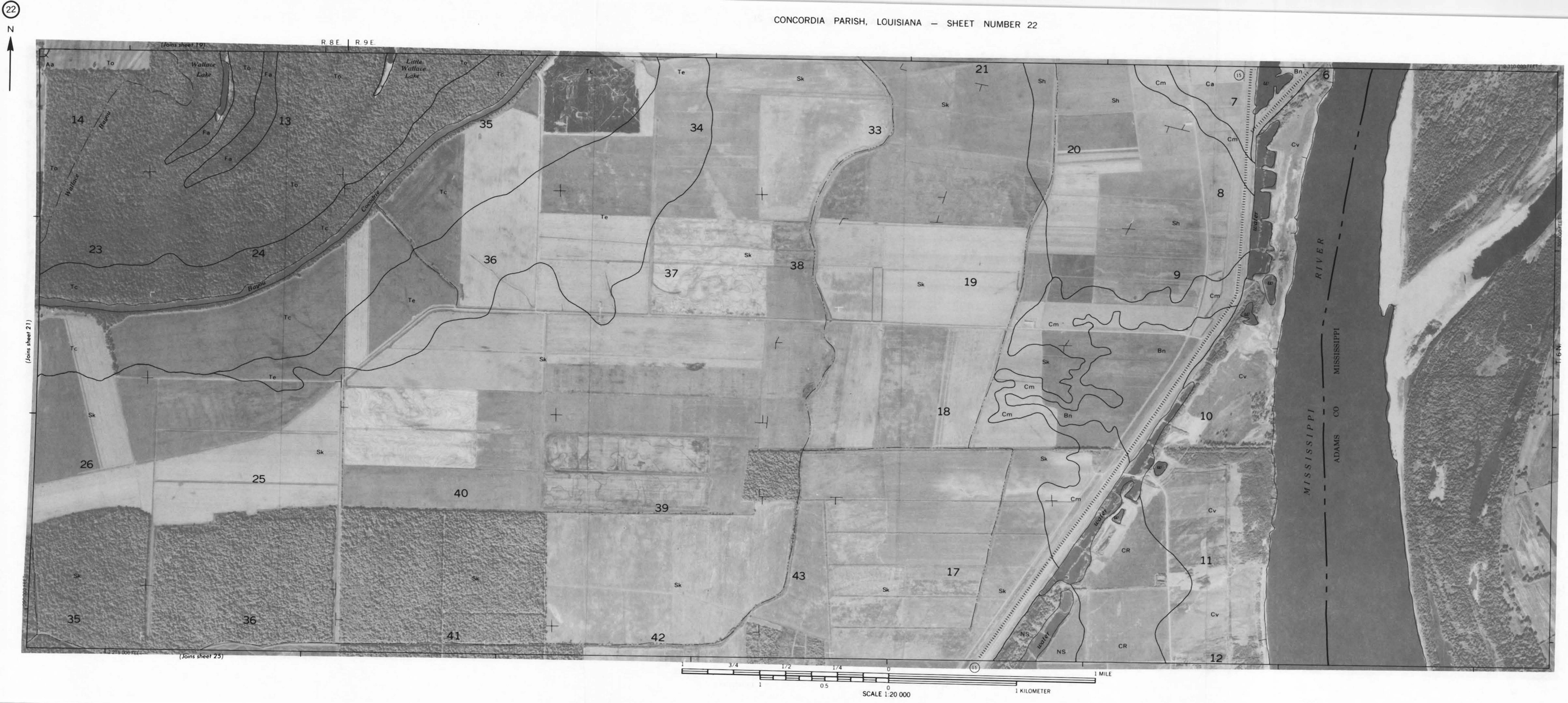
㉑

CONCORDIA PARISH, LOUISIANA NO. 21

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned



CONCORDIA PARISH, LOUISIANA — SHEET NUMBER 22



This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

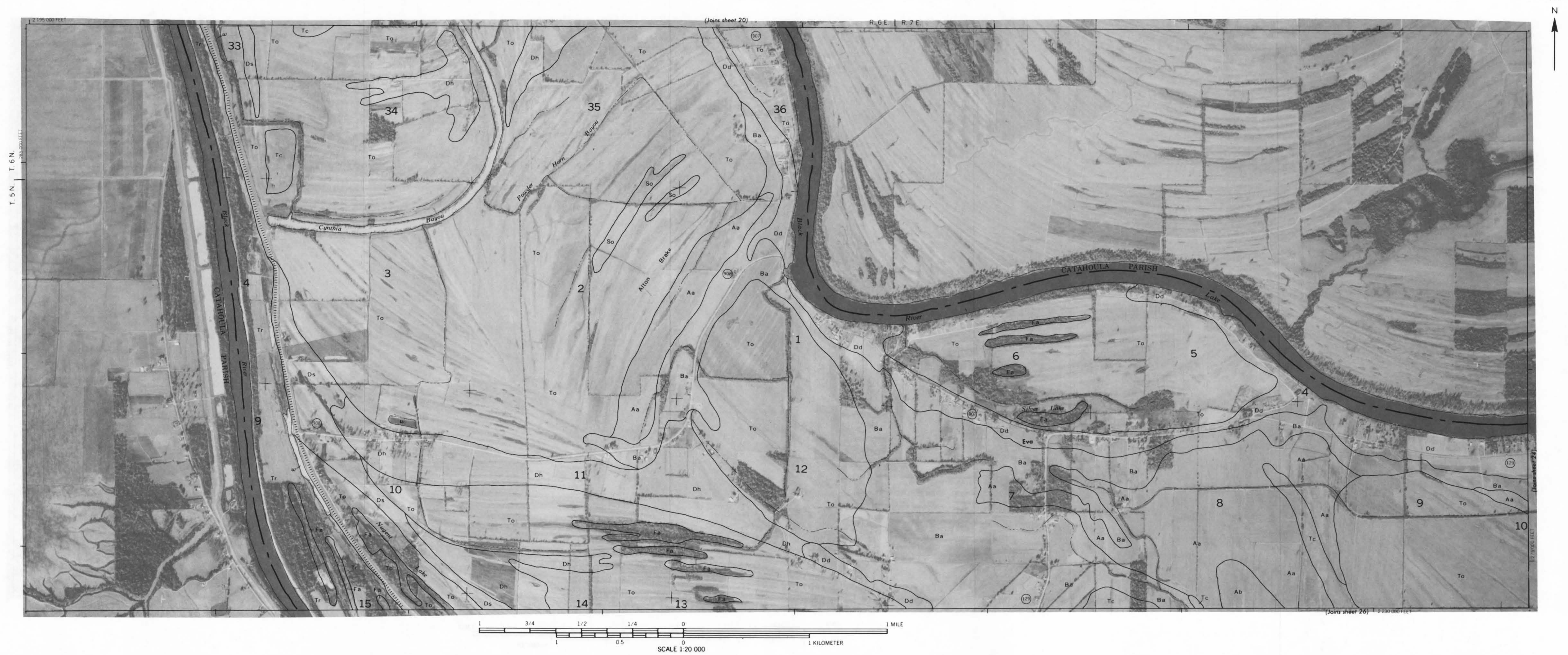
CONCORDIA PARISH, LOUISIANA NO. 22

CONCORDIA PARISH, LOUISIANA — SHEET NUMBER 23

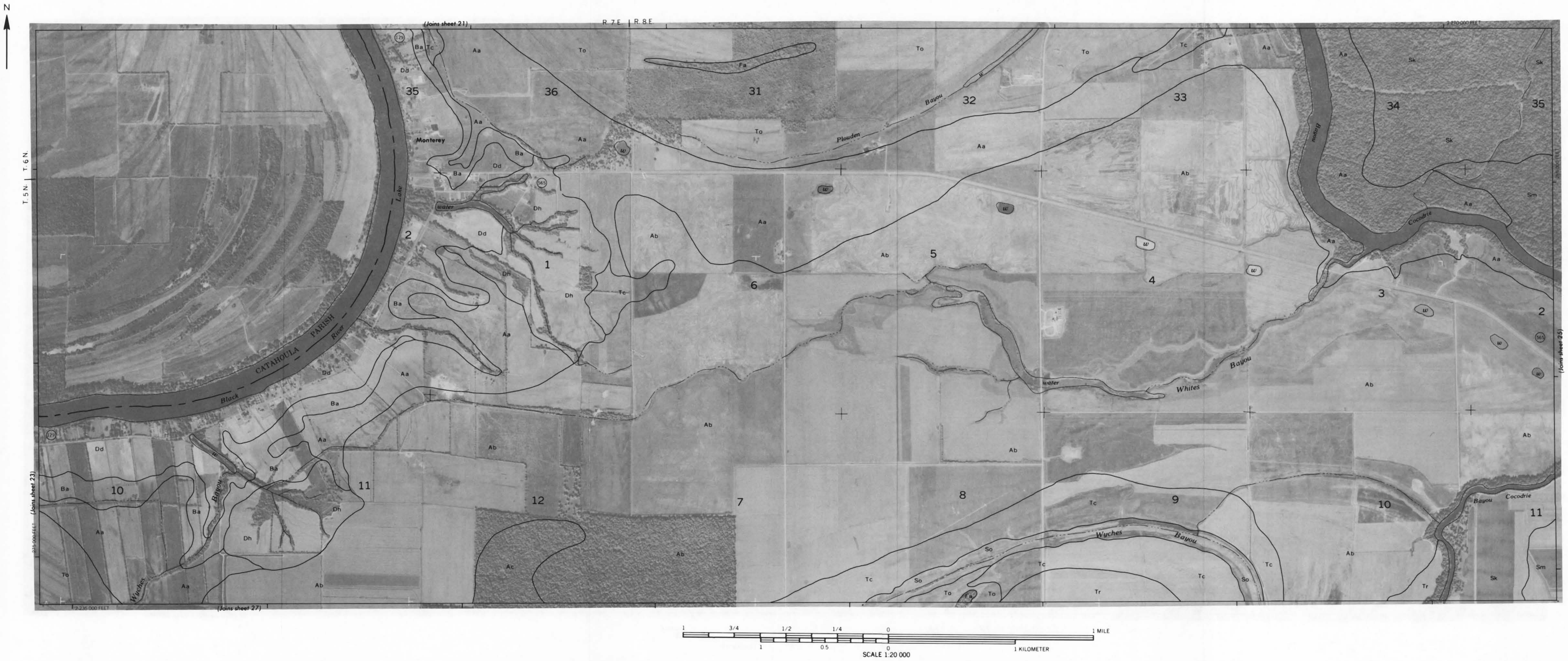
(23)

CONCORDIA PARISH, LOUISIANA NO. 23

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



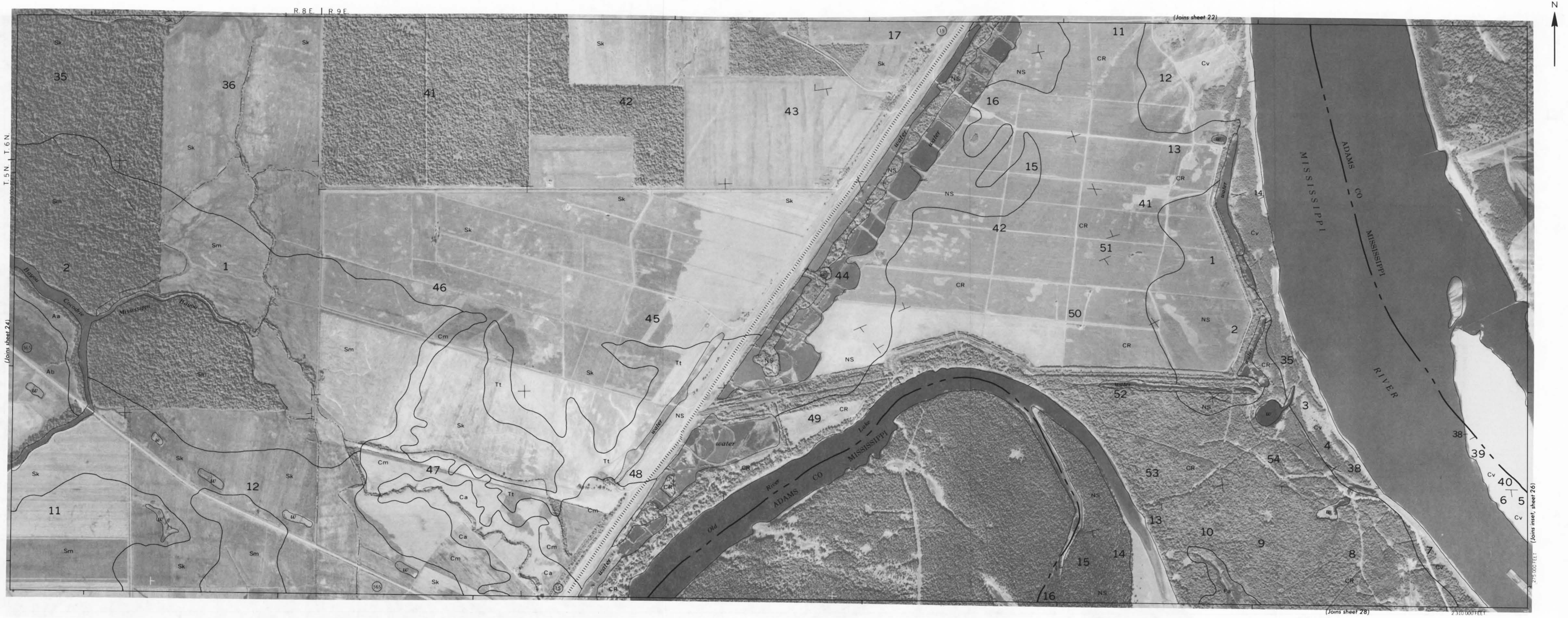
CONCORDIA PARISH, LOUISIANA — SHEET NUMBER 24



This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CONCORDIA PARISH, LOUISIANA NO. 25

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

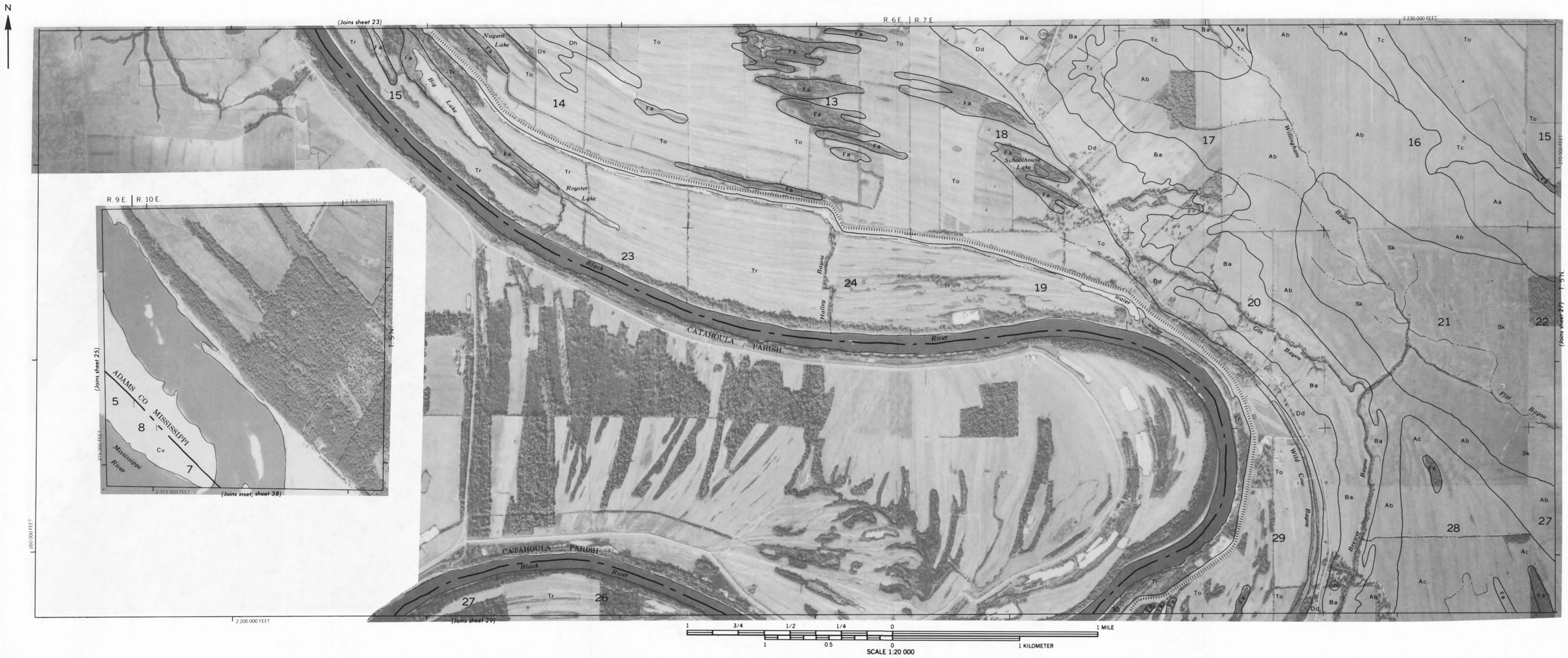


1 3/4 1/2 1/4 0 1 MILE

1 0.5 0 1 KILOMETER

SCALE 1:20 000

CONCORDIA PARISH, LOUISIANA — SHEET NUMBER 26



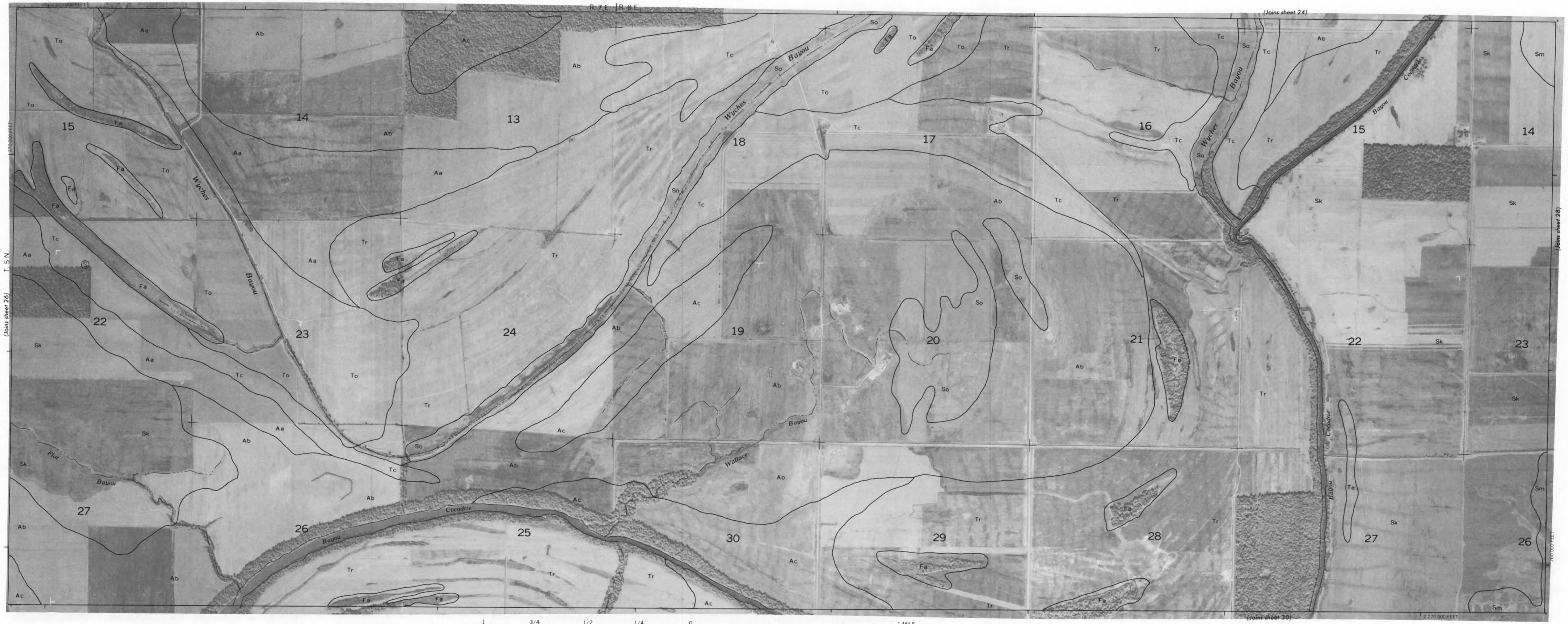
This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CONCORDIA PARISH, LOUISIANA NO. 26

CONCORDIA PARISH, LOUISIANA — SHEET NUMBER 27

CONCORDIA PARISH, LOUISIANA NO. 27

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



27

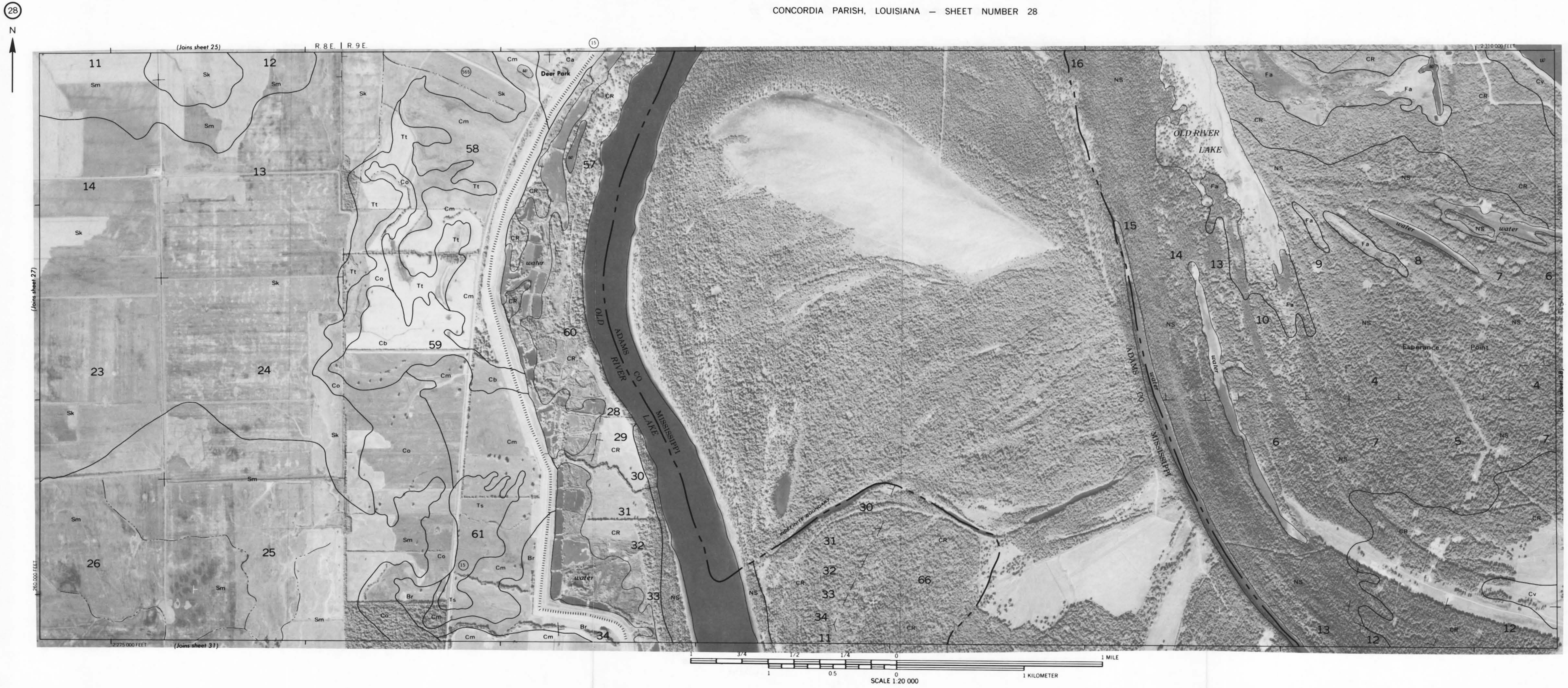
N

1 3/4 1/2 1/4 0 1 MILE

1 0.5 0 1 KILOMETER

SCALE 1:20 000

CONCORDIA PARISH, LOUISIANA — SHEET NUMBER 28



SCALE 1:20 000

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

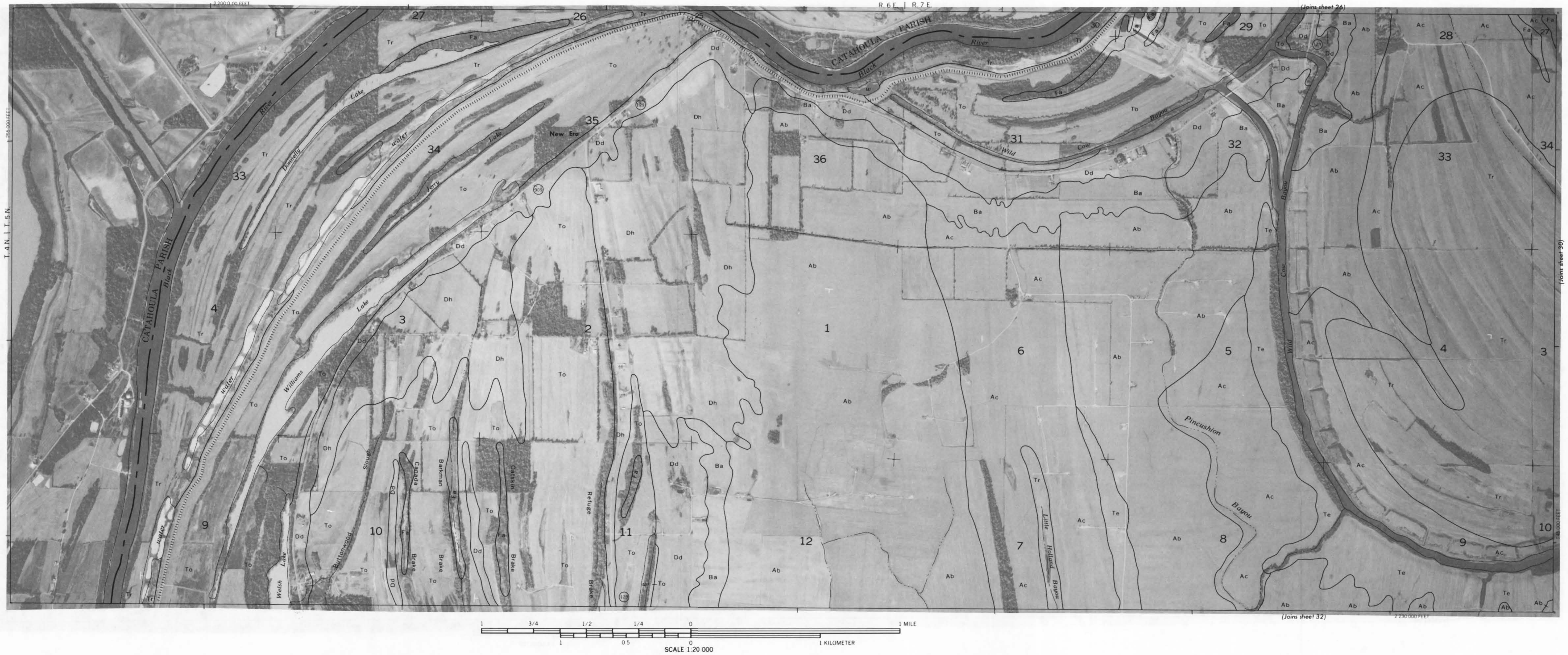
CONCORDIA PARISH, LOUISIANA NO. 28

CONCORDIA PARISH, LOUISIANA — SHEET NUMBER 29

(29)

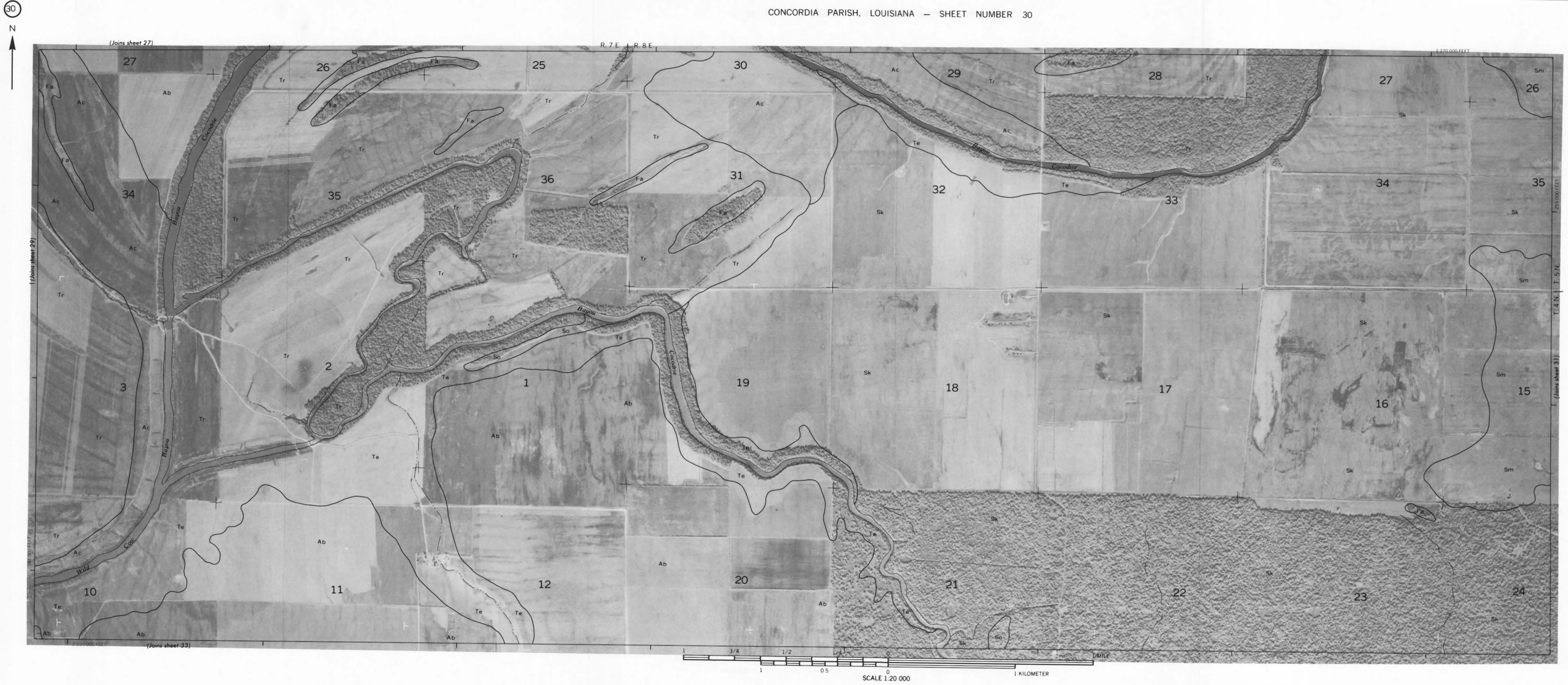
CONCORDIA PARISH, LOUISIANA NO. 29

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



SCALE 1:20 000

CONCORDIA PARISH, LOUISIANA — SHEET NUMBER 30



This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

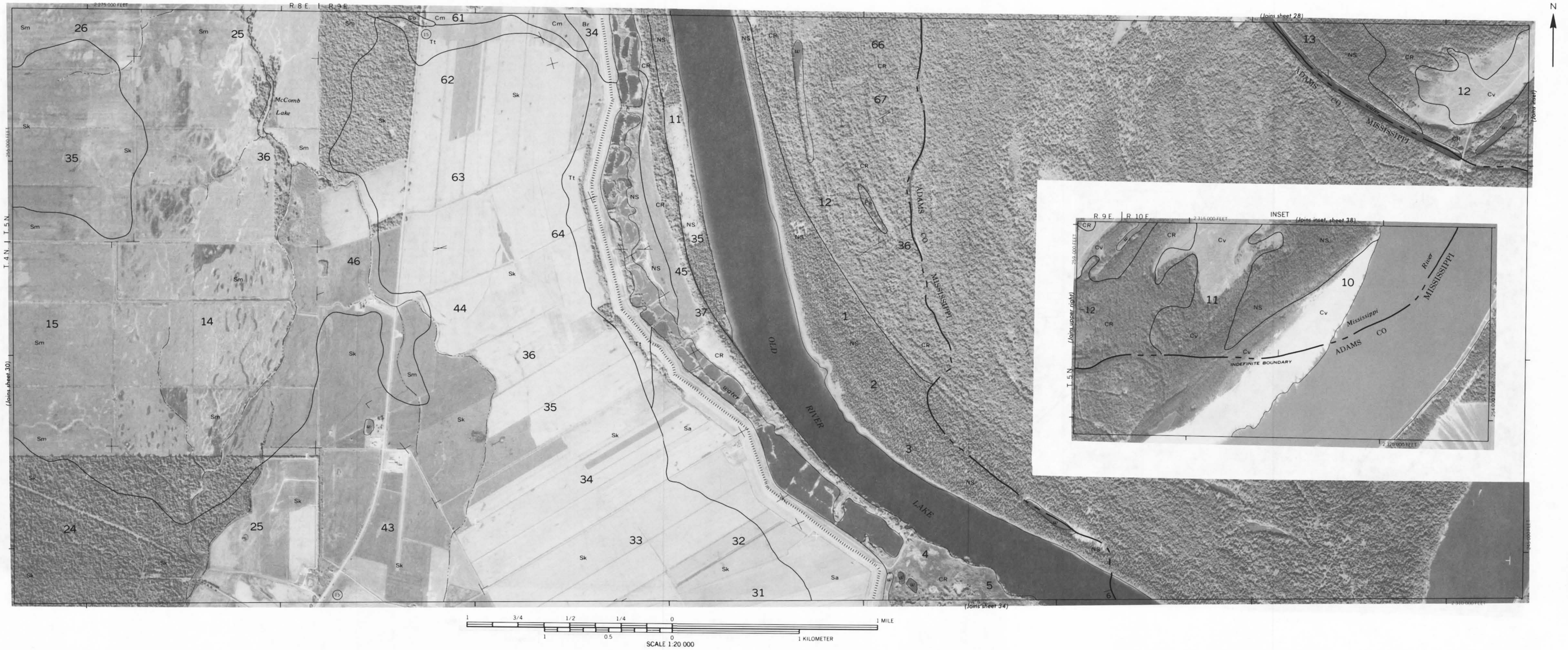
CONCORDIA PARISH, LOUISIANA NO. 30

CONCORDIA PARISH, LOUISIANA — SHEET NUMBER 31

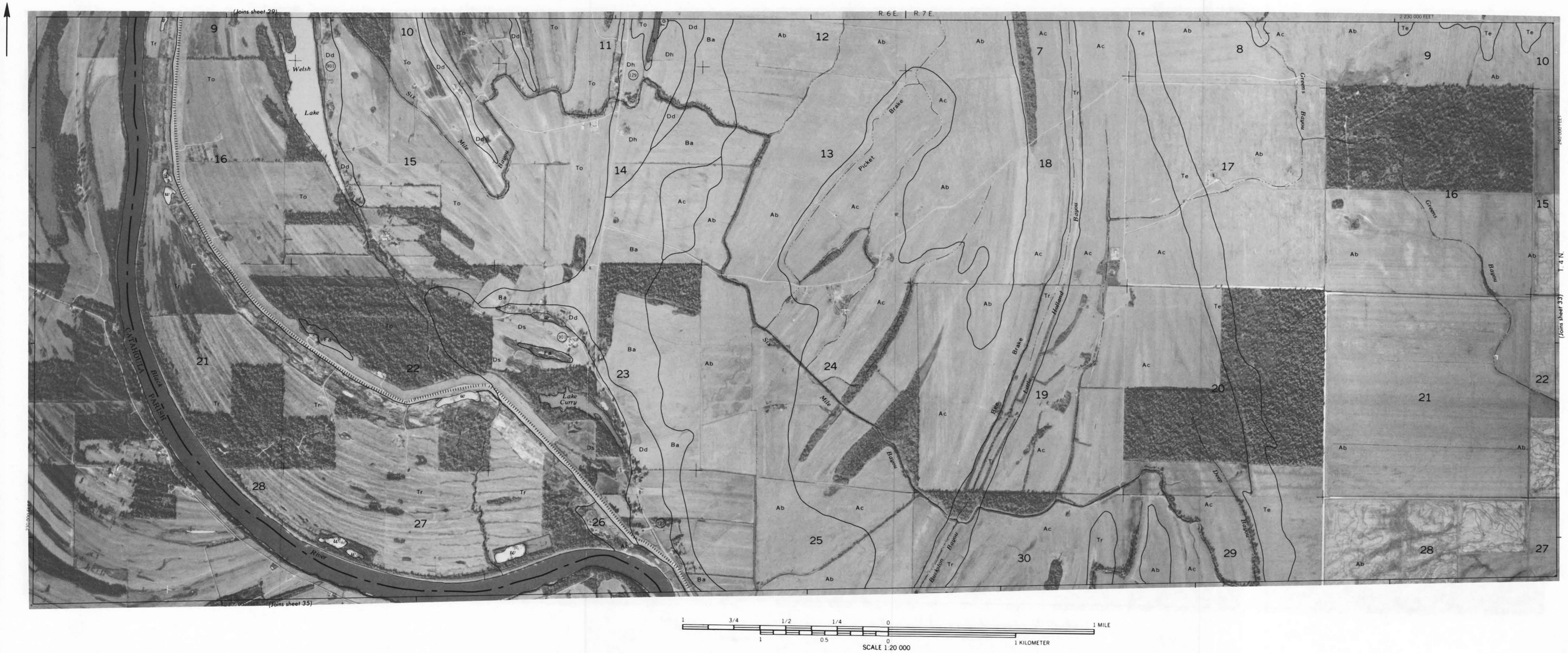
㉛

CONCORDIA PARISH, LOUISIANA NO. 31

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



CONCORDIA PARISH, LOUISIANA — SHEET NUMBER 32



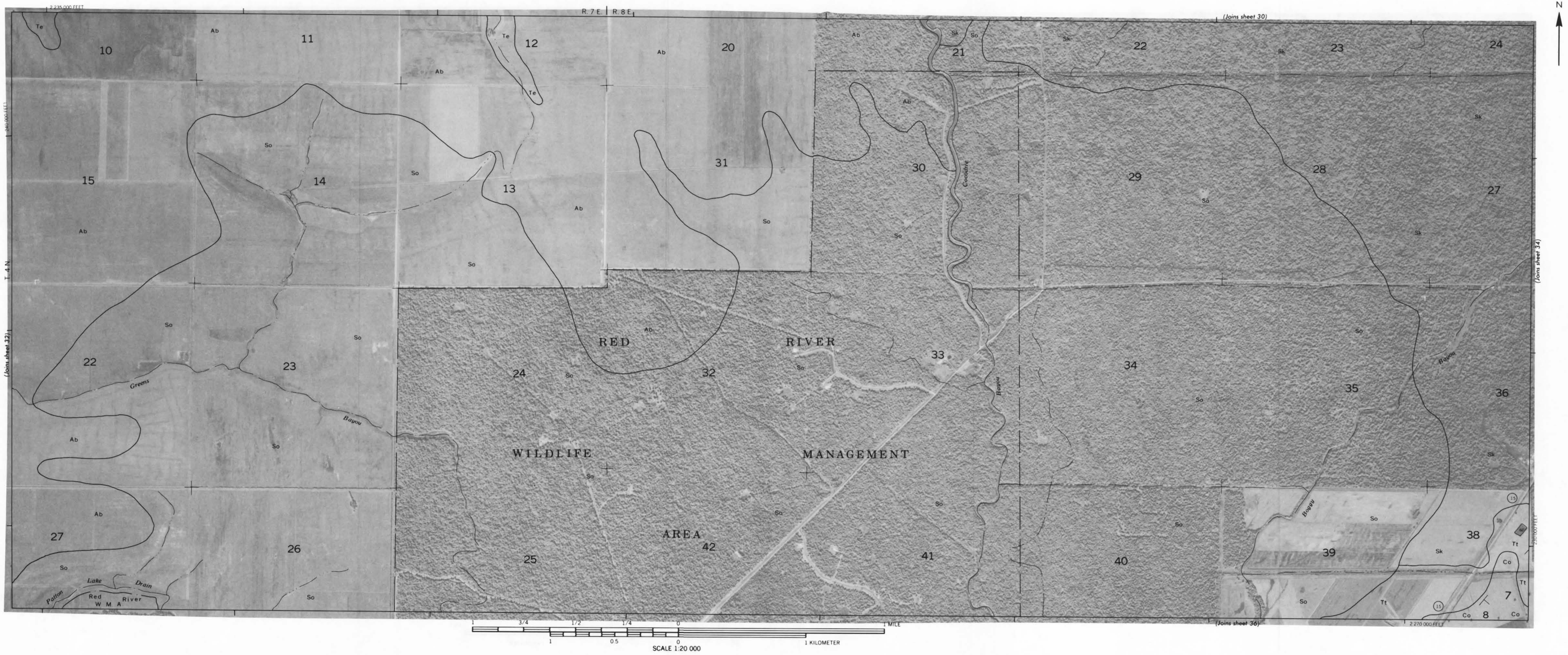
This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CONCORDIA PARISH, LOUISIANA NO. 32

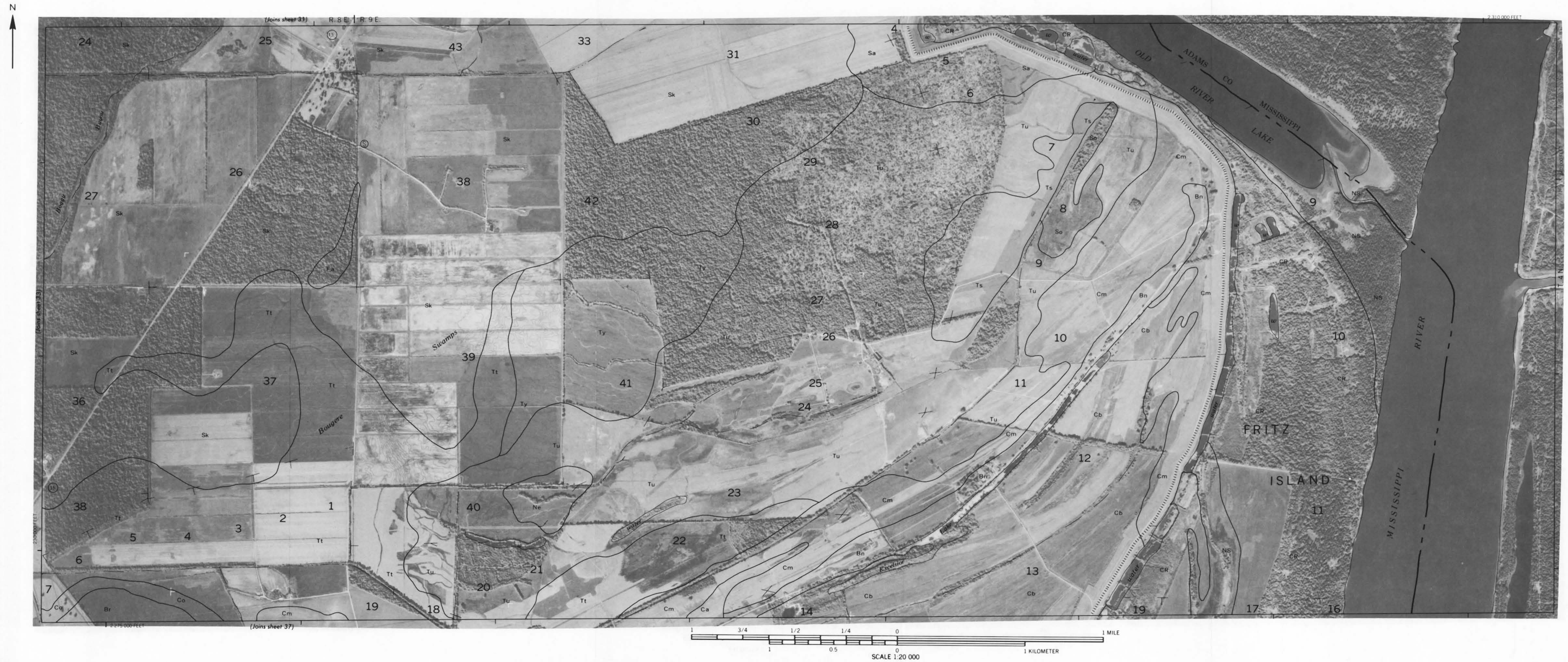
CONCORDIA PARISH, LOUISIANA — SHEET NUMBER 33

CONCORDIA PARISH, LOUISIANA NO. 33

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

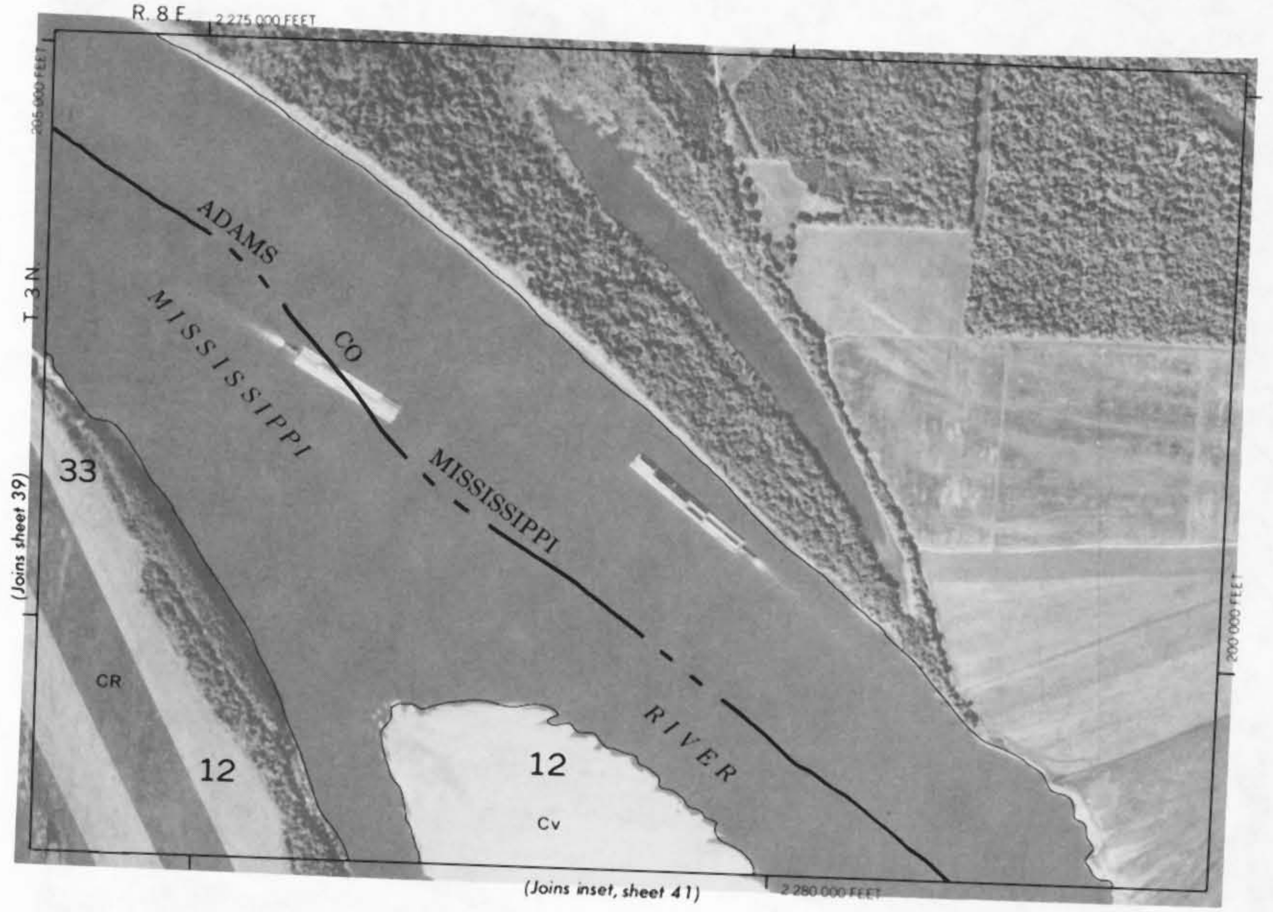


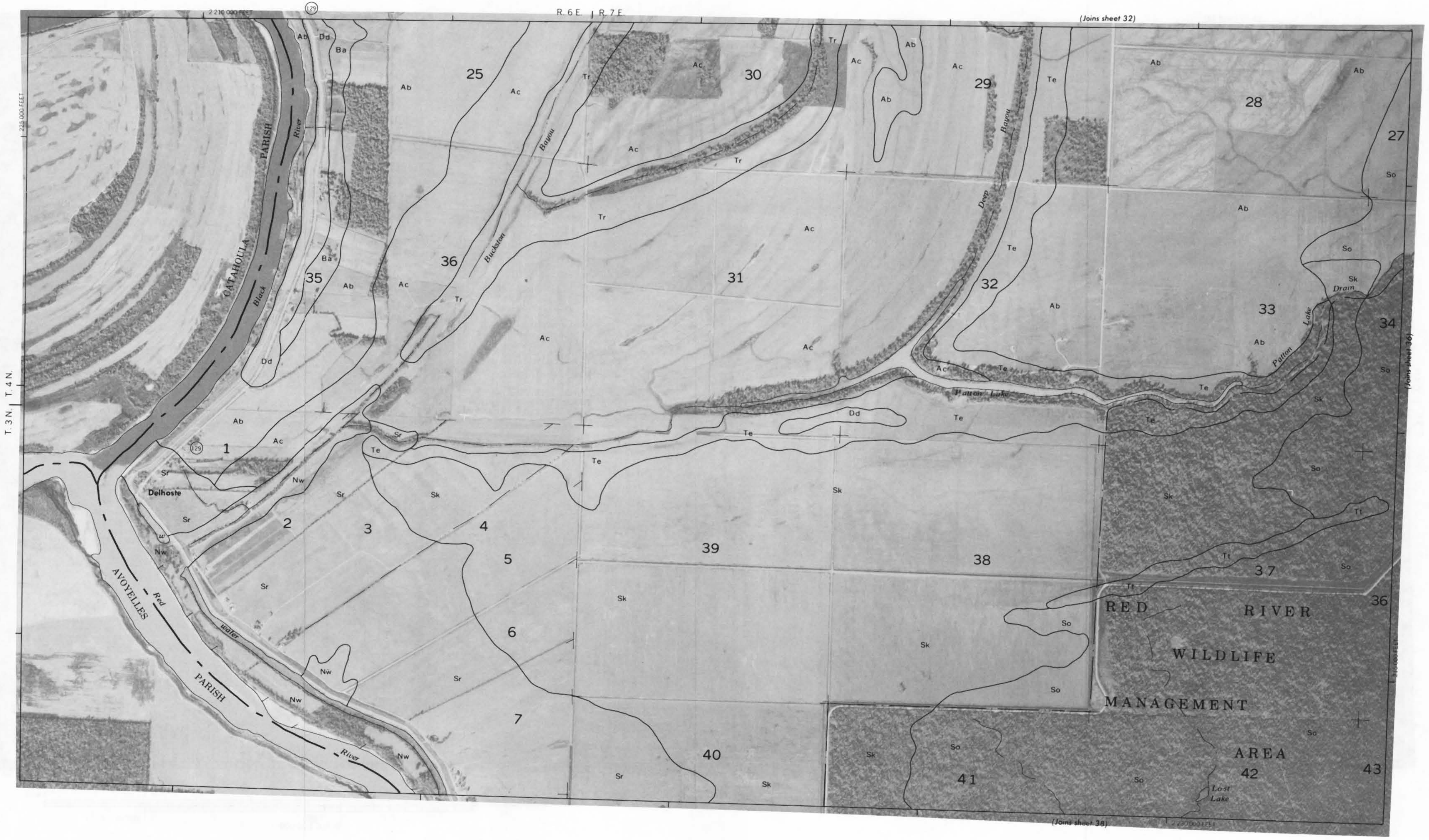
CONCORDIA PARISH, LOUISIANA — SHEET NUMBER 34



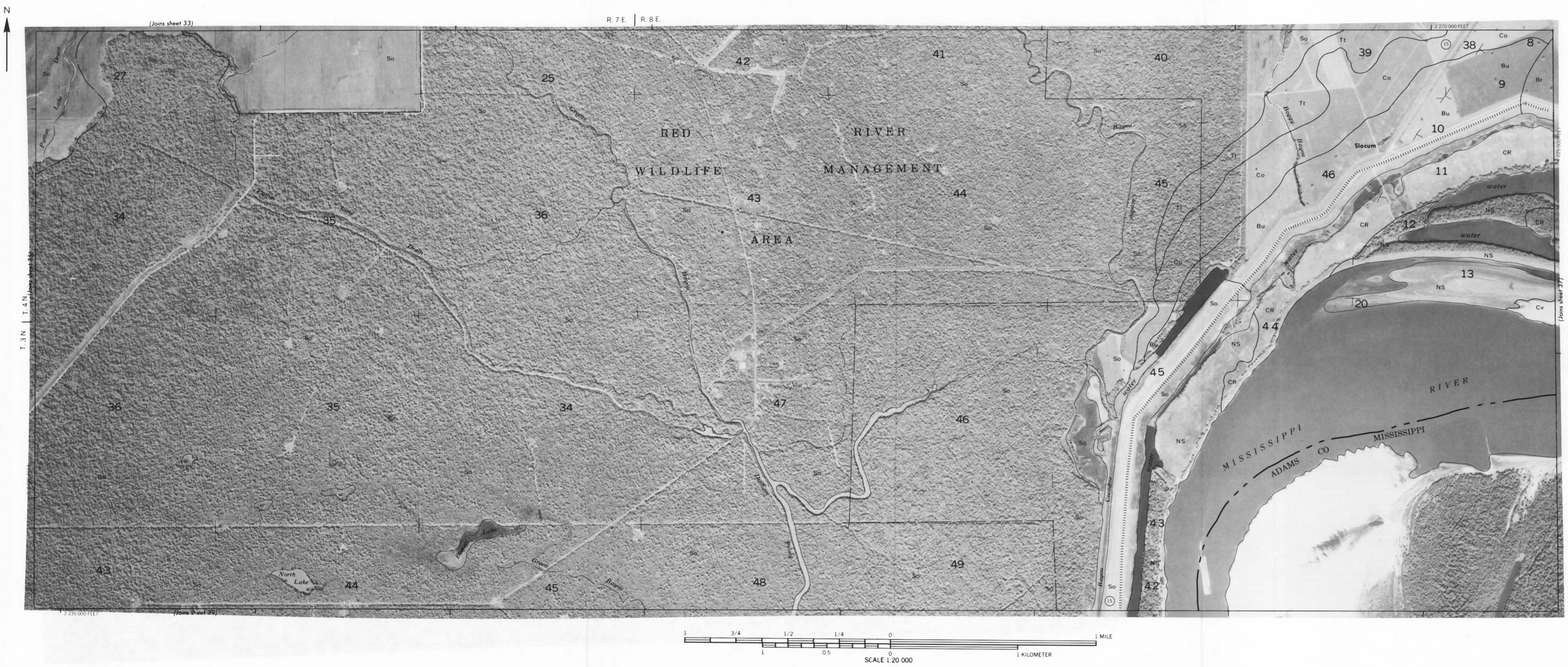
This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.





CONCORDIA PARISH, LOUISIANA — SHEET NUMBER 36



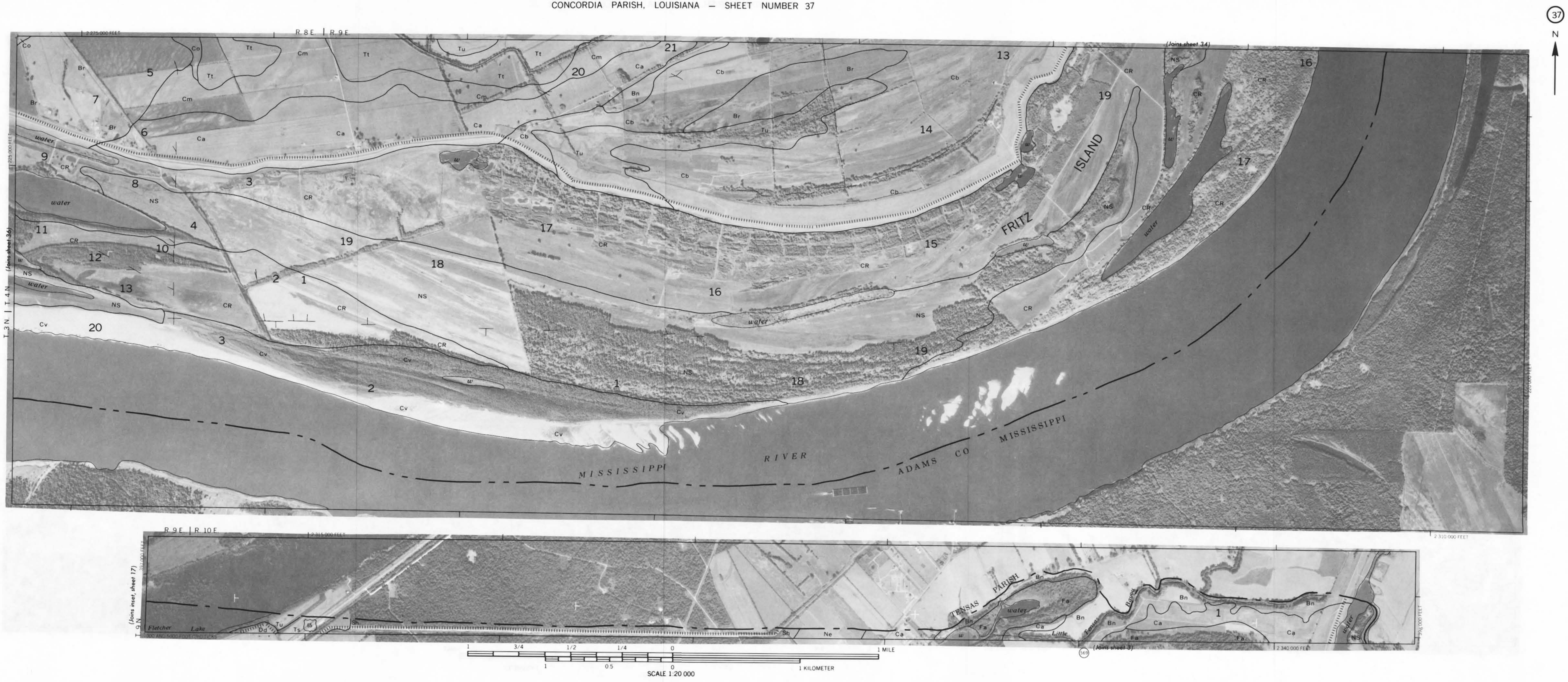
This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CONCORDIA PARISH, LOUISIANA NO. 36

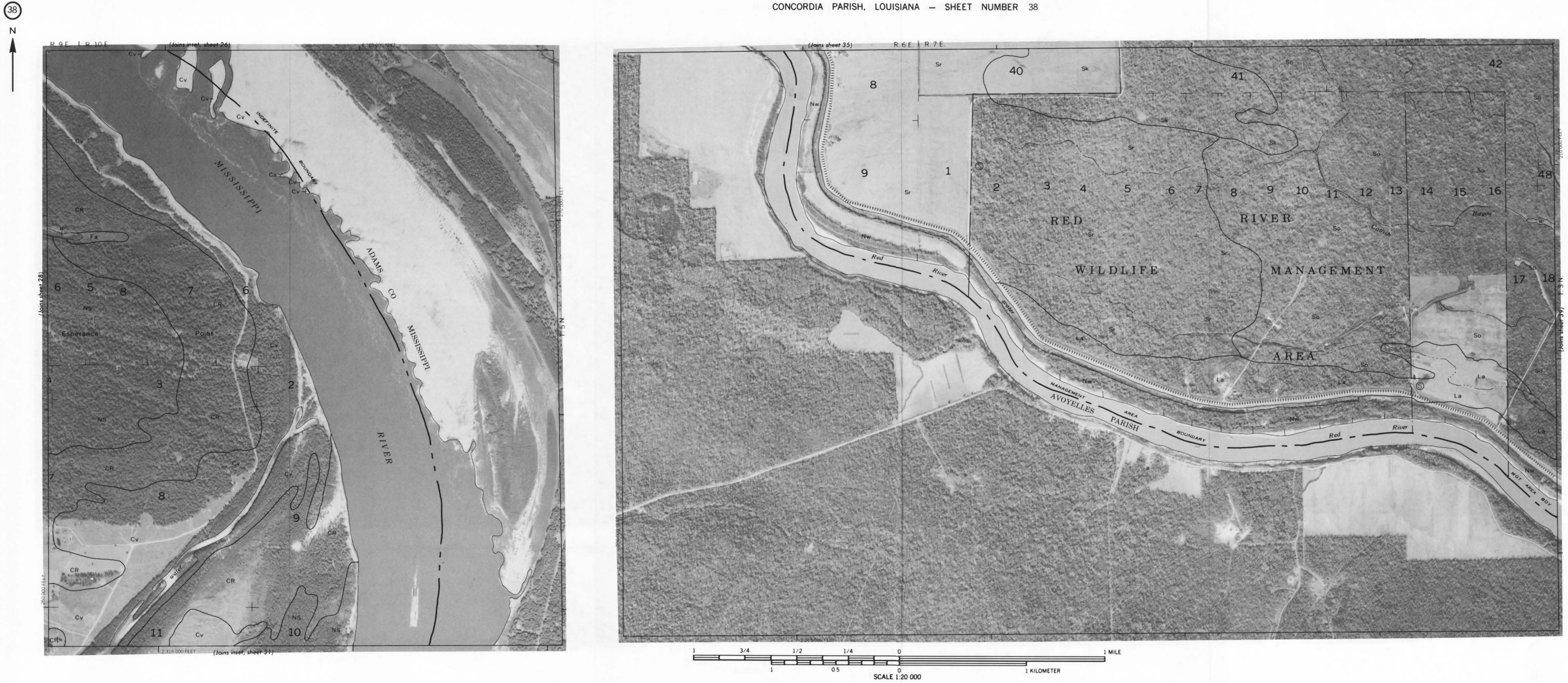
CONCORDIA PARISH, LOUISIANA — SHEET NUMBER 37

CONCORDIA PARISH, LOUISIANA NO. 37

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



CONCORDIA PARISH, LOUISIANA — SHEET NUMBER 38

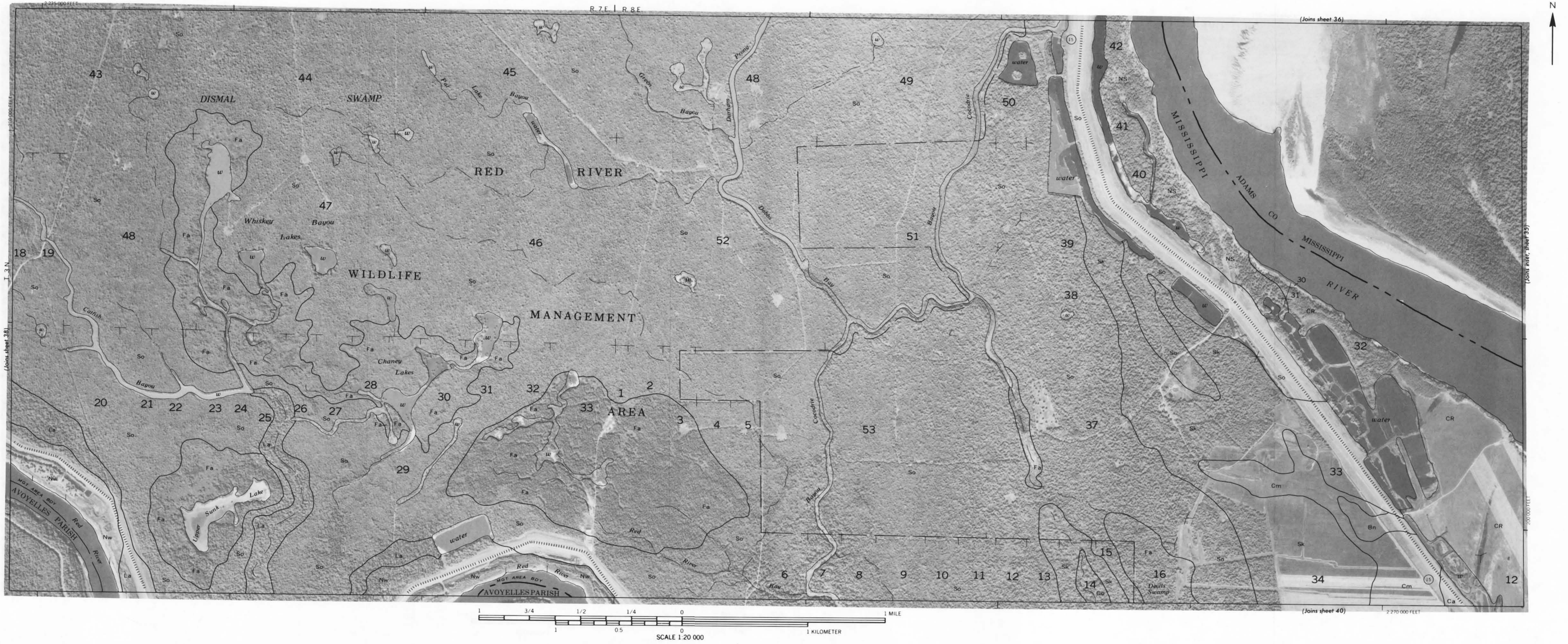


This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

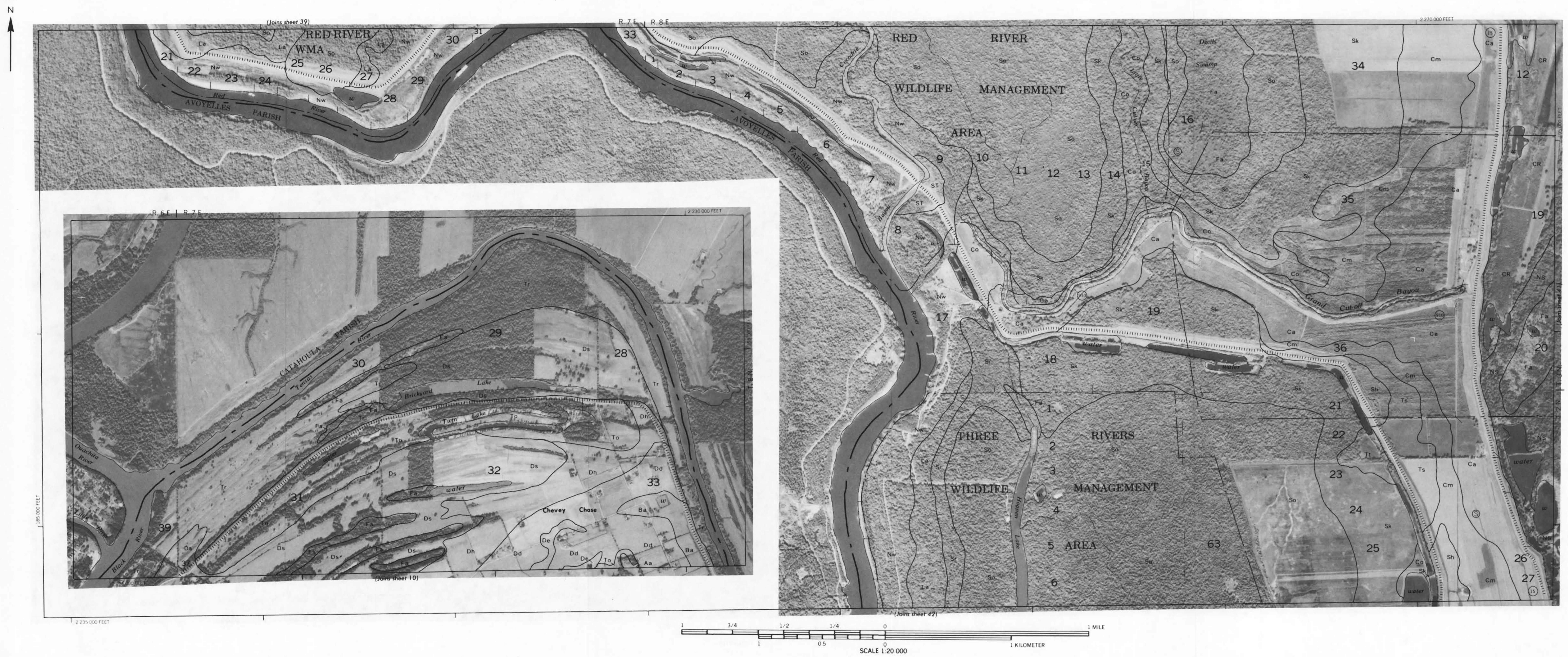
CONCORDIA PARISH, LOUISIANA NO. 38

CONCORDIA PARISH, LOUISIANA NO. 39

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



CONCORDIA PARISH, LOUISIANA — SHEET NUMBER 40



This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

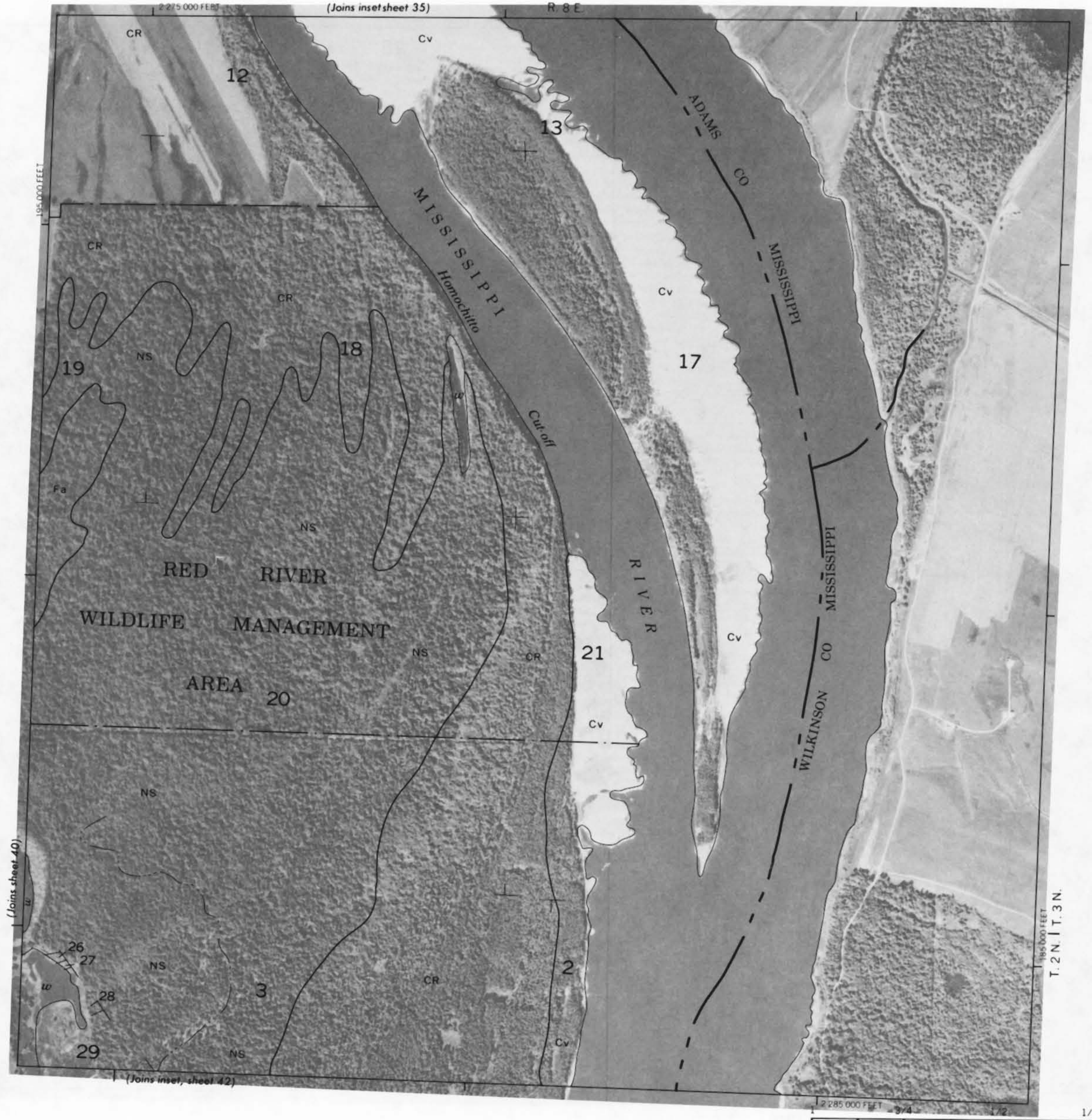
CONCORDIA PARISH, LOUISIANA NO. 40

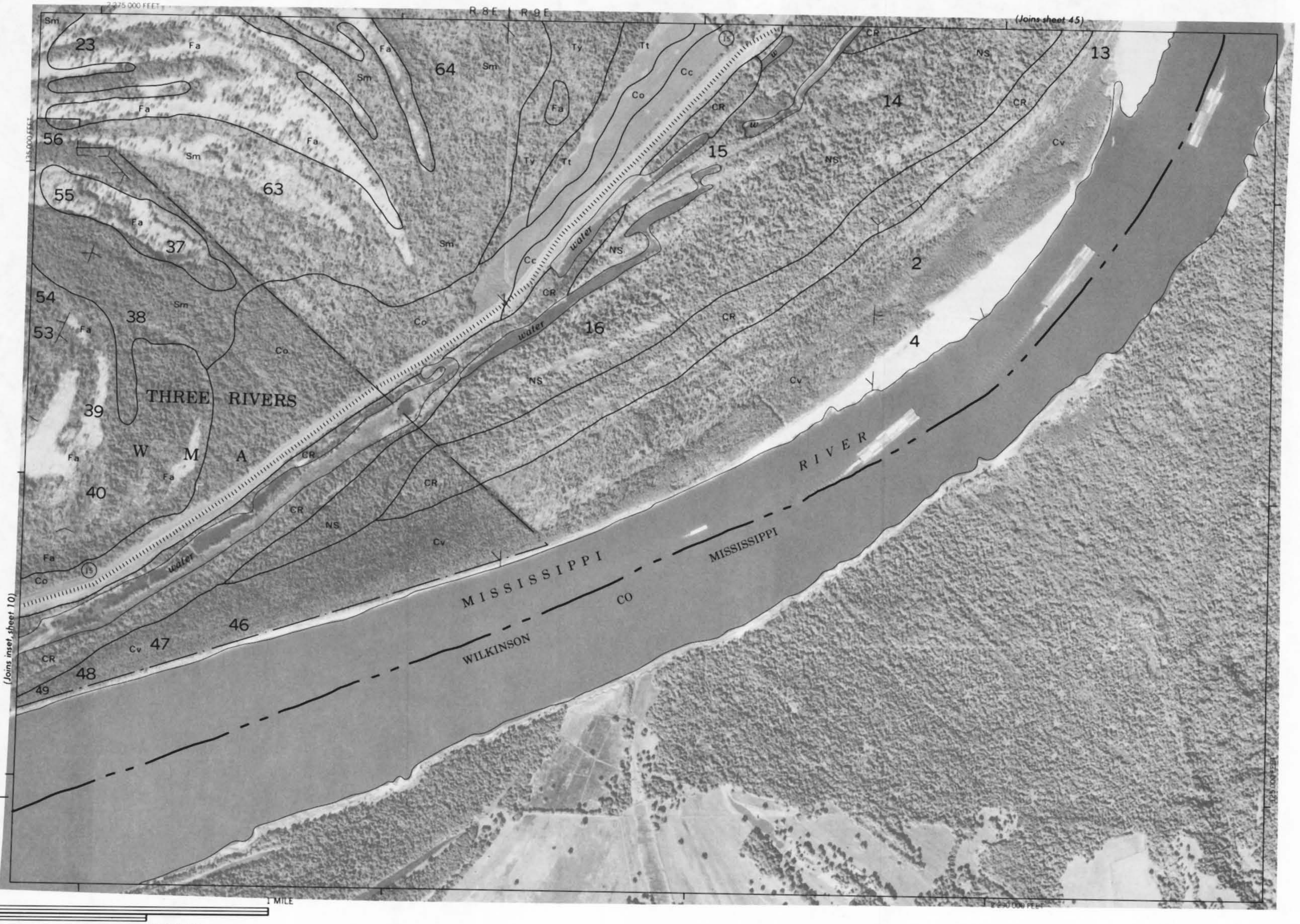
㊶

N

CONCORDIA PARISH, LOUISIANA NO. 41

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.





1/4 0 1 MILE

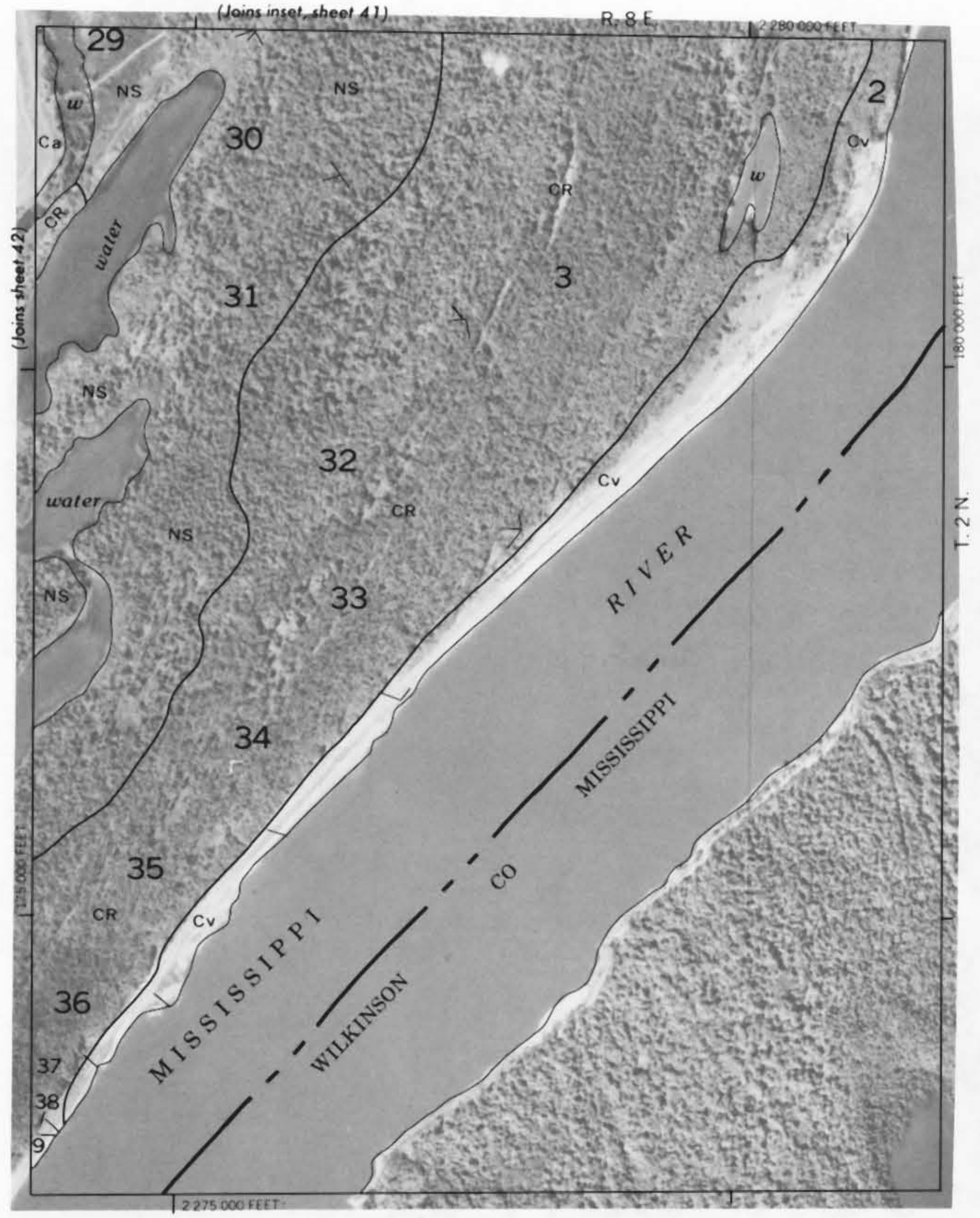
1 0.5 0 1 KILOMETER

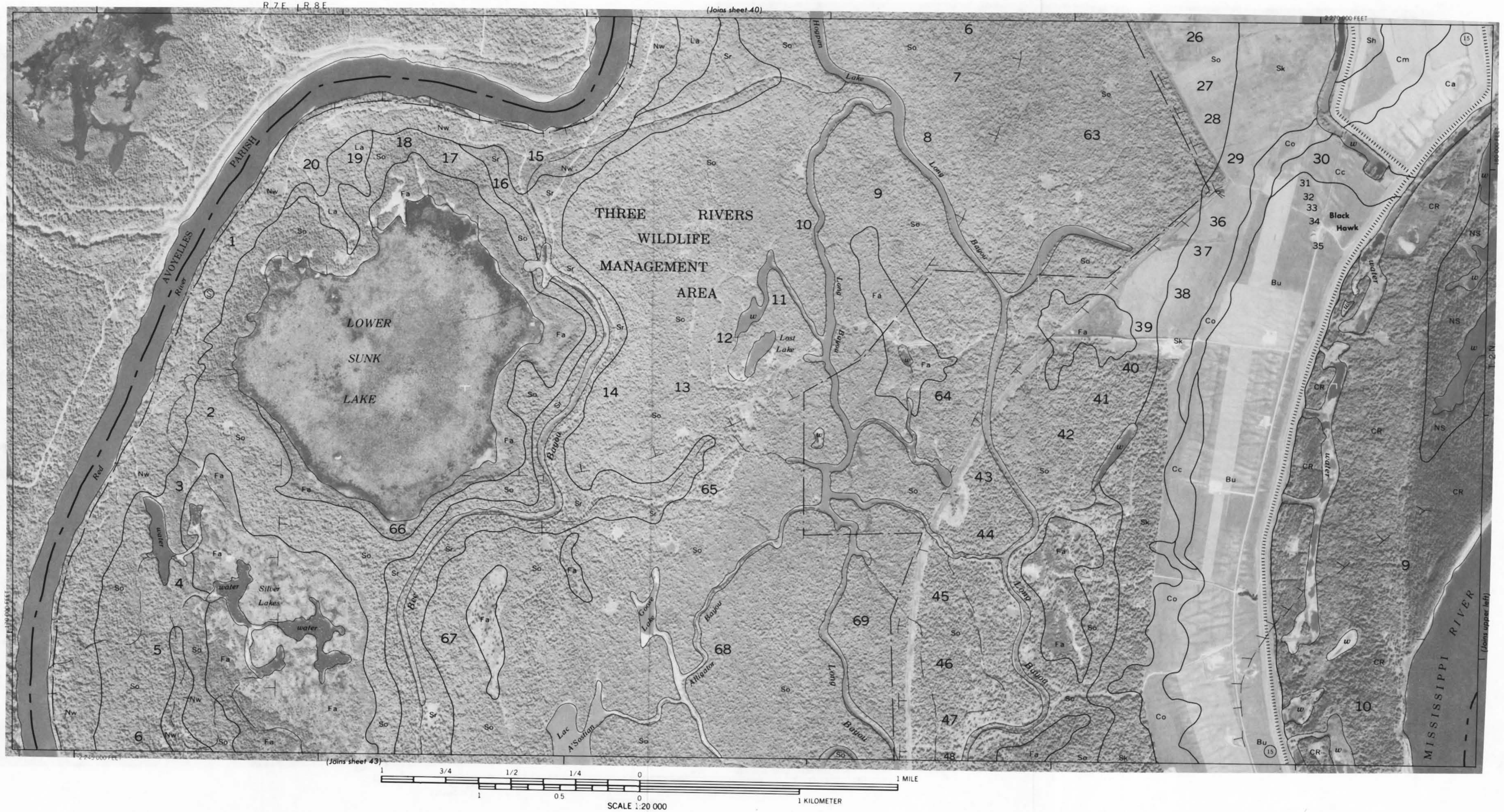
SCALE 1:20 000

㊷

N

CONCORDIA PARISH, LOUISIANA — SHEET NUMBER 42





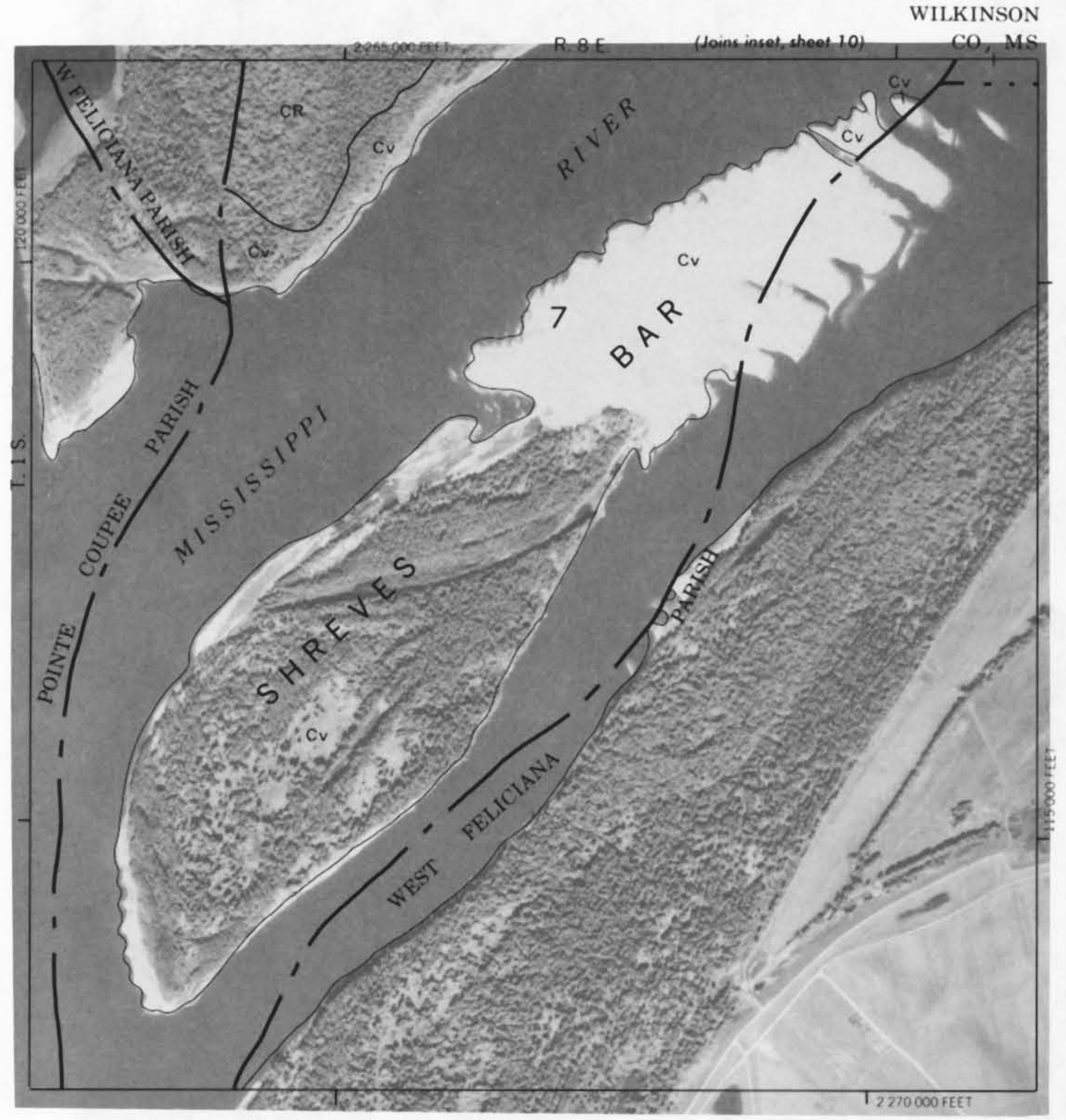
This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

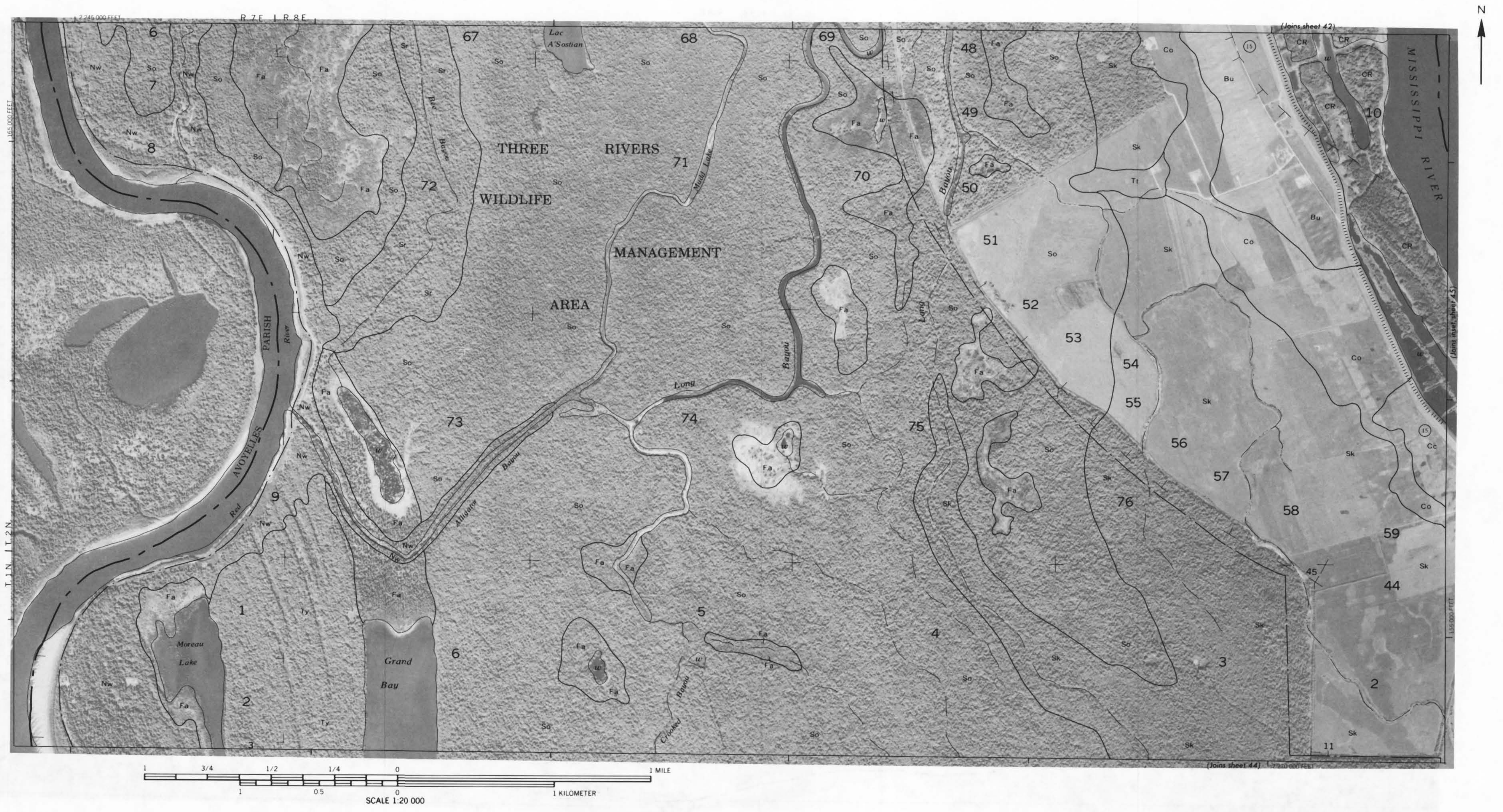
CONCORDIA PARISH, LOUISIANA NO. 42

CONCORDIA PARISH, LOUISIANA — SHEET NUMBER 43

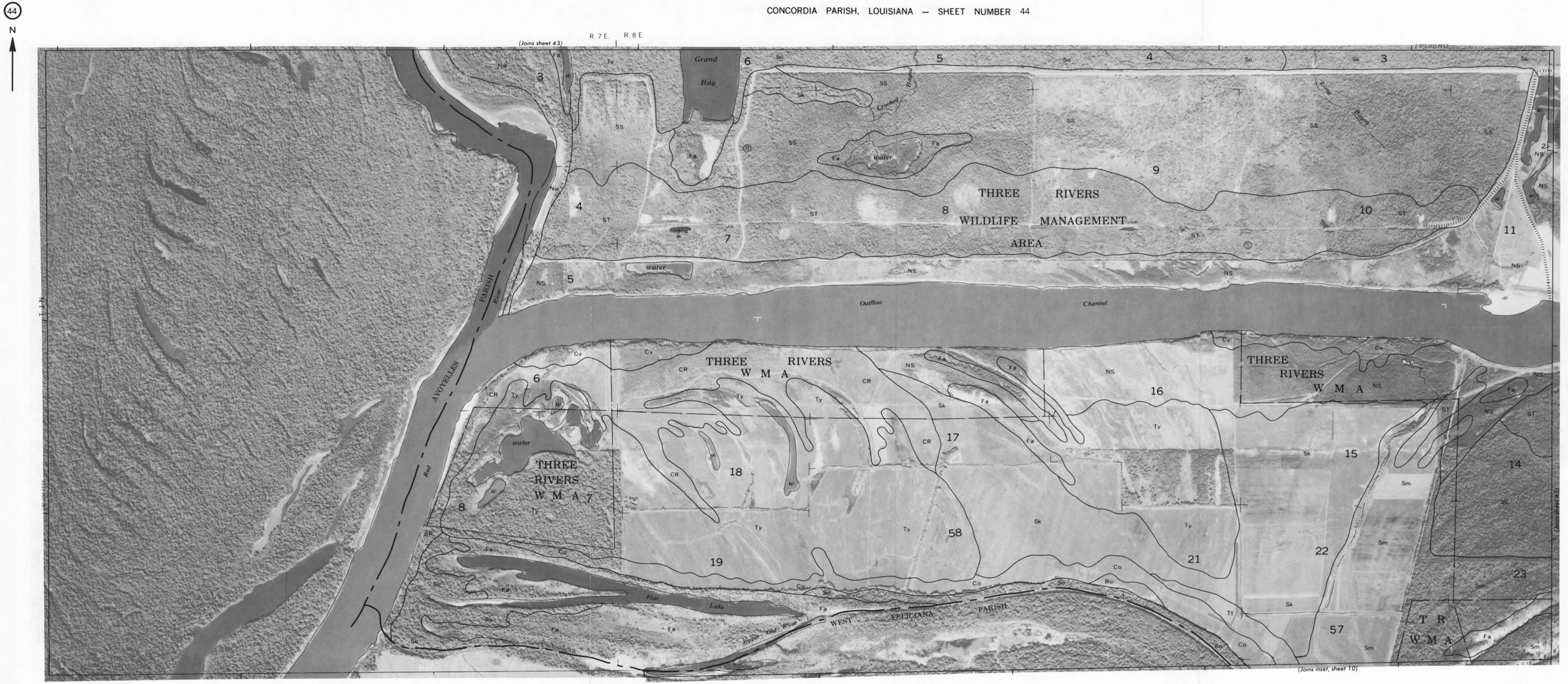
CONCORDIA PARISH, LOUISIANA NO. 43

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.





CONCORDIA PARISH, LOUISIANA — SHEET NUMBER 44



This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CONCORDIA PARISH, LOUISIANA NO. 44

CONCORDIA PARISH, LOUISIANA NO. 45

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.